The Commercial Car Journal

VOLUME XI | PHILADELPHIA, MAY 15, 1916 | NUMBER 3

PLENTY OF CHEAPER GASOLINE IN THE FUTURE

The work of the United Motor Fuel Corp., of Manhattan, N. Y., in the interests of the automobile manufacturers during the last month, point to four conclusions—first, and most important—that the future has in store an abundant supply of motor fuel at prices lower than those prevailing; second, that no process now in common use, does all that can be done in the production of gasoline; third, that no process except the Burton is as yet a demonstrated economical commercial success; fourth, that at least two processes now in their infancy, will eventually develop into important factors in price reduction.

These deductions are based on examinations of all the well known processes and a number not so well known; of the probable supply of crude oils; of the possibility of using crudes now almost neglected as sources of gasoline supply and on careful examination of all patents since the issue to Charles H. Hall in 1869.

The company has been flooded with all sorts of proposals, but is interested in nothing except processes demonstrated and in actual operation. Of these it has examined three and has two others under consideration. So far it has seen nothing to warrant faith in abnormally cheap chemical compounds or secret processes, but an examination is being made of one produced by a chemist of excellent reputation, but who makes no claim of extraordinary cheapness.

SENATE TO MAKE RITTMAN PROCESS AVAILABLE

The resolution of Senator James authorizing the Secretary of the Interior to receive an assignment of the Rittman patent for improvement in gasoline manufacture, was adopted recently by the senate. Director Manning, of the bureau of mines, with which Dr. Rittman formerly was connected, informed the senate the patent promises to increase gasoline production from 15 to 45 per cent. of the crude oil used. Immediate steps to make the process available to the public were authorized.

TRUCK EXPORTS IN FEBRUARY, 1916, DOUBLE THOSE OF SAME MONTH OF LAST YEAR

During February, 1916, the number of trucks exported doubled the amount exported during February, 1915. In February of this year 2,063 trucks, valued at $6,170,367 were exported. For the 8 months of the fiscal year ending with February, 14,467 trucks, valued at $38,729,721 were exported. This was more than the entire amount for 1915.

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ONE WAY OF ELIMINATING THE CURBSTONE DEALER

The North Dakota and Western Minnesota Auto Dealers' Association has found that it can eliminate the curbstone dealer by making it known to the manufacturer that if he places his line of goods with the curbstone dealer that he will probably have hard work to place his goods in the hands of a legitimate dealer in the future.

The way the dealers of this Association have taken care of the price cutter is to throw him all the business they possibly can, informing the consumer that he is foolish to pay list price, as it is customary for this dealer to give a discount. They let the buyer know that if he approaches this dealer in the proper manner that he can probably make his purchases at about cost, thereby teaching the dealer such a lesson that he either reforms and gets his legitimate price or is forced out of business.

PERLMAN RIM STOCK OFFERED TO PUBLIC

Perlman Rim Co., which was recently organized to manufacture the Perlman demountable rim, is issuing $10,000,000 worth of stock. Only $5,000,000 is being offered to the public for subscription at $120 per share, subscriptions being taken by J. S. Bache & Co., New York City. The remaining $5,000,000 worth is being retained by Kaufman, Durant & Perlman, who jointly own the entire amount. The Perlman Rim Corp. will have 100,000 shares of stock of no par value and will have no bonds or debt. It starts with $3,000,000 cash.

The directors of the company are: L. G. Kaufman, president of the Chatham and Phoenix National Bank; W. C. Durant, president of the Chevrolet Motor Co.; L. H. Perlman, and Christian Girl, president of the Perfection Spring Co. Perlman is president of the new company, Christian Girl is vice-president, and the executive committee is composed of L. G. Kaufman, chairman; W. C. Durant and L. H. Perlman.

The Standard Welding Co. has been active in protecting its interests and it is said to have in nearly complete form new plans for furnishing its customers with rims. It is understood that this company will manufacture a new rim which, according to competent legal authority, does not infringe the Perlman patent. Users of rims in large quantities are said to have approved the design, and manufacturing of the rim is already under way.

COLUMBIA AXLE PRODUCTION INCREASED

The plant of the Columbia Axle Co., Cleveland, Ohio, has recently been enlarged. Seventy-five per cent. more floor space has been added, thereby doubling the production of Columbia axles. An interesting feature of the new factory building is a sound-proof testing room. Specially constructed walls shut out all sound from this room. The floors and testing racks are of concrete with very solid foundations. Two hundred new men have been added to the factory force.

HEAVY TRUCKS MAY HAVE TO PAY EXTRA TAX IN NEW YORK STATE

The New York Legislature is considering the advisability of an extra tax on heavy motor trucks touring the state of New York, and a committee to gather data will be appointed. Other work to be taken up will be the consideration of taxing horse drawn vehicles and the question of eliminating dazzling headlights.

The CCJ has most advertisers because it gives them biggest returns

ELECTRIC VEHICLE INTERESTS AT THE NATIONAL ELECTRIC LIGHT ASSOCIATION CONVENTION

Three sessions will be occupied by the new Electric Vehicle Section at the National Electric Light Association Convention May 22-26th, 1916, at Chicago. The tenative Electric Vehicle sessions are as follows:

First Electric Vehicle Session, Wednesday, May 24, 10 A. M.

1—Address of Chairman, Walter H. Johnson; 2—Report of Secretary, A. Jackson Marshall; 3—Report of Treasurer, H. M. Edwards; 4—Report on Section Activities, Secretary Marshall; 5—Report of Committee on Membership, Joseph D. Israel; 6—Report of Committee on Standardization, E. R. Whitney; 7—Report of Committee on Motion Picture Films, Carl H. Reed; 8—Report of Committee on Traffic and Good Roads, A. H. Manwaring; 9—Report of Committee on Insurance, Day Baker; 10—Election of Nominating Committee.

Second Electric Vehicle Session, Wednesday, May 24, 2.30 P. M.

1—Report of Committee on Garages and Rates, George B. Foster; 2—Report of Committee on Legislation, P. D. Wagoner; 3—Report of Committee on Federal and Municipal Transportation, James H. McGraw; 4—Paper: Industrial Truck Applications, C. W. Squires; 5—Paper: Electric Truck Problems and How to Minimize Them, F. E. Whitney; 6—Paper: The Relation of Tires to Electric Vehicle Efficiency, S. N. Norton; 7—Paper: Greater Garage Service, Harry Salvat.

Third Electric Vehicle Session, Thursday, May 25, 10 A. M.

1—Report of Committee on Operating Records, W. P. Kennedy; 2—Report of Committee on Central Station Co-operation, E. S. Mansfield; 3—Paper: The Exchange Battery System, P. D. Wagoner; 4—Paper: Passenger Vehicle Problems and Activities, E. P. Chalfant; 5—Paper: Central Station Promotion of Electric Vehicle Use, W. P. Kennedy; 6—Report of Committee on Nominations; 7—Election and Installation of Officers, Adjournment.

TRUCK MAKER BUYS FREIGHT CARS

To combat the present freight car shortage, so keenly felt by automobile manufacturers, F. W. Ruggles, general manager of the Republic Motor Truck Co., whose plant is located at Alma, Mich., has placed a large order for private freight cars capable of carrying from two to four of their largest trucks at a load.

It is the intention to use these new cars for shipping to the largest dealers only, which means that the Republic Motor Truck Co. will have its own equipment in constant use between such cities as New York, Boston, Chicago, Kansas City, Portland, Seattle, Los Angeles and to Detroit, a truck market which is now looming bigger each month.

Beckley-Ralston Co., Chicago, recently placed an order for 300,000 A. C. spark plugs to be shipped as fast as they could be delivered.

Stewart Accessories Mfg. Co., Detroit, Mich., has just been granted patents on the Off-An-On tire tool in the United States and Canada with all claims allowed.

NATIONAL TRACTOR DEMONSTRATIONS FOR 1916

The 8 large National Tractor Farming Demonstrations, conducted in different sections of the country this year, will be strictly educational in nature. There will be no competing for Gold Medals, and no Blue Ribbons by the tractor which finishes its land first, or performs the most spectacular stunts.

They will be held during successive weeks and each will last a period of 5 days, Monday being opening day, the other days being devoted to private and public demonstrations. Each afternoon from one to three will be devoted to public demonstrations, while the forenoons from 8.30 to 11.30 will be devoted to private demonstrations. These forenoon demonstrations will not be limited to plowing. Opportunities will be given for disking, seeding, packing, manure spreading and operating all other kinds of machinery found on the average farm. This will make it possible for all interested in tractors to arrange their work so they can attend the big demonstrations one or more days and see all classes of work performed.

Each field to be plowed will be measured carefully on the morning before it is to be plowed and divided into as many lands as there are tractor companies demonstrating. The amount of land assigned to each exhibitor will be determined by the number of plow bottoms drawn, the width of plows and the speed of engines as given in the company's catalogue. The positions on the field will be assigned alphabetically, according to the name of the company on the first day and shifted daily in accordance with the rules governing the demonstration.

Dynamometer tests will be made on each field in the morning preceding the demonstration; for this purpose a 14 in. plow will be used, running at a depth to be specified by the general manager. After such tests are made, the actual pounds drawbar pull for a 14 in. plow will be furnished each manufacturer in order that they may determine the number of plows which their tractor should pull.

Each tractor exhibitor will burn the kind of fuel he desires, but all will be required to obtain it from the same source which will also be designated by the management. This will insure fair play to all exhibitors, as no company will be permitted to use fuel of a higher gravity test than that of his competitor. The grade of fuel will be kept uniform at all times, under the direction of the State Inspector of Oils.

The men who have been employed to assist in constructing these demonstrations are absolutely disinterested in either tractor or plows, and will carry out the rules and regulations accepted by the National Power Farming Committee.

Auto Electric Service Co., of New York City, has taken over the Eisemann Magneto service station at 245 W. 55th St., and will act as Eisemann service station for New York City, Long Island, Bronx, and Westchester and Rockland Counties in New York State, and Bergen, Hudson, Essex and Union Counties in New Jersey.

MARYLAND TRUCK OWNERS WANT BILL VETOED

Senator Bennett, of Maryland, has introduced Bill No. 638, to which the public motor truck owners are objecting vigorously and have asked Governor Emerson C. Harrington to veto it. The gist of the bill is that motor trucks running on a fixed and definite route should be charged, in adding to the regular license, anywhere from ⅛ to ¼ of a cent per ton mile, according to capacity, said revenue to be used for State roads.

The truck owners object on the ground that the bill imposes a special and extremely burdensome tax on one type of truck and not on another, and that about half of the trucks used for general merchanidse or freight have no fixed or definite routes and if they should be excluded, the tax would then be applied only on those trucks which have a fixed and definite route; for instance, the milk truck, which must make its calls for milk at a fixed and regular time and deliver the same at a fixed and regular time, and return at an approximate leaving time, but no fixed routing. Should the bill go through it would impose a tremendous tax on a small class and small number, and will drive them out of business.

BOCK BEARING COMPANY REORGANIZED

The plant of the Bock Bearing Co. on Phillips Avenue, Toledo, O., has been taken over by a new corporation having a capital of $1,650,000. The new company was incorporated recently under the name of the Bock Taper Roller Bearing Co. Of the stock issued by the new corporation, $1,200,000 will be common and $450,000 will be 7 per cent. cumulative preferred. Holders of old stock will exchange share for share of new stock, and old preferred will receive two shares of new common for one of preferred. The capacity of the plant will be tripled, giving an output of 3,000 bearings daily.

The following officers have been elected: President, W. E. Bock; vice-president, Eugene Rheinfrank; secretary and treasurer, C. H. Clement. The officers, with M. H. Murch, of Cleveland, and J. E. Dunipace, of Toledo, comprise the directorate.

DOEHLER TAKES OVER AMERICAN DIE CASTING COMPANY

The Doehler Die Casting Co., Brooklyn, N. Y., and Toledo, O., has acquired the controlling interest in the American Die Casting Co., of Newark, N. J., which will hereafter be known as the Doehler Die Casting Co. of New Jersey. Its present management remains the same.

The Commercial Vehicle Committee of the National Automobile Chamber of Commerce, has called a meeting of all members making trucks, to be held at the headquarters of the N. A. C. C., 7 E. 42d St., New York City, on June 7th, for the purpose of discussing certain standardization in truck making, and to consider the advisability of holding a commercial vehicle show as advocated by some makers.

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Personal Items

O. R. Wolf, sales manager of Woods Mobilette Co., Chicago, has resigned.

R. E. Watrons, general sales manager of the Sheridan Commercial Car Co., Chicago, has resigned.

Roscoe A. Pickens has been made director of sales of the Metz Co., Waltham, Mass. He has been connected with the sales organization of that company since September, 1911.

Fred B. Geary, formerly connected with the Kelly-Springfield Tire Co., New York City, has become affiliated with the McGraw Tire & Rubber Co. as manager of the Newark branch, succeeding W. P. Fraley.

Charles M. Kohn, formerly sales manager of the Hurlburt Motor Truck Co., is now Eastern manager of the Gramm-Bernstein Co., with offices at 1457 Broadway, New York City. He is succeeded by B. F. Walker.

Bryce E. Blackley, formerly New England division sales manager of the Chase Motor Truck Co., Syracuse, N. Y., has become assistant to H. T. Boulden, general sales manager, succeeding W. A. Clare, resigned.

A. L. Riker, vice-president of the Locomobile Co. of America, was elected a director of the National Automobile Chamber of Commerce, to fill the vacancy caused by the death of S. T. Davis, Jr., who was president of the same company.

N. G. Klove, who has been secretary and treasurer of the Sandow Truck Co., Chicago, since the time of its organization, about four years ago, has disposed of all his interests in the company to T. L. Beach, the president.

R. H. Spear, formerly general manager of the Scripps-Booth Co., has become general sales and advertising director of the Gramm-Bernstein Co., Inc., Lima, O. He is an efficiency man and has written several books on the subject. Mr. Spear is the author of "The Commercial World Encyclopedia of Accounting," covering over 2,500 business objects. Sixteen other business books have been written and published by him, one of which, "Scientific Auditing," was sold to 60 per cent. of all professional auditors in the United States and Canada in six months.

J. C. Barbour, Cleburne, Tex., has put on an auto freight and express service between Cleburne and Glen Rose.

Henry C. Snowden, hardware dealer in Media, Pa., is covering 50 per cent. more territory with his truck than when he used horses.

Hudson Doughty Lumber Co., Newton, Kans., states that truck haulage has increased its zone of trade 15 miles in each direction.

Frank E. Merrill, a box manufacturer of Turner, Me., states that he makes 40-mile cross country deliveries with his truck, where formerly he used railroads.

The Hudford Co. of the Bronx has purchased land at Third Avenue & 135th Street, New York City, on which will be erected a four-story concrete building to be used as a salesroom, assembling plant and service station.

Detroit-Wyandotte Truck Co., Wyandotte, Mich., recently elected the following officers: G. A. Horner, president and general manager; Frank Marx, vice-president and treasurer, and R. A. Parker, secretary. These officers, with Otto Schmidt and M. C. Wick, form the board of directors.

New Incorporations

Lakeside Motor Truck Attachment Co., New York City, has been formed with $50,000 capital to manufacture motor trucks, farm tractors, etc.

Ohio Gas Generator Co., Columbus, O., has been formed to manufacture a kerosene vaporizing device patented by Theo. Webber, formerly of Buffalo.

Sandow Motor Truck Co., Portland, Me., has been incorporated with a capital stock of $150,000 to buy, sell, hire, operate, etc., motor trucks, autos, etc.

Stevenson Mfg. Co., Sedro-Wooley and Burlington, Wash., has been organized for the purpose of manufacturing a truck attachment for all makes of cars and with a capacity of from 1 to 2 tons.

J. & D. Tire & Rubber Co., Charlotte, N. C., has been organized with a capital stock of $500,000. The following officers have been elected: H. O. Smith, president; Thos. J. Northway, vice-president; L. A. Folger, secretary, and C. C. Coddington, treasurer. A thoroughly modern concrete plant is being constructed in which will be manufactured a high quality of tire.

Reeps Mfg. Co., 50 Church St., New York City, was recently incorporated with a capitalization of $25,000. The company is the inventor and manufacturer of the Reeps dashboard, oil and gasoline gages for automobiles, the Reeps warning signals for bicycles and motorcycles and several other electrical and mechanical devices. Chas. S. Shuman, at one time connected with the Western Electric Co. at Philadelphia, is president and treasurer.

American Rubber & Tire Co. has been organized at Akron, Ohio, and has purchased and succeeded to the business of the American Tire & Rubber Co. The officers of the new company are: Fred H. Snyder, president; Chas. Dietz, vice-president; Geo. W. Kratsch, secretary and treasurer; Henry L. Houk, general manager and assistant treasurer; J. W. Rock, factory manager. A two-story addition to the plant is in course of construction, and the company is making a complete line of tires and accessories, including American Indian red tubes, 5-minute-cure vulcanizing cement and repair materials.

Thomas Auto Truck Co., Inc., 639-41 W. 51st St., New York City, has been incorporated to manufacture Thomas commercial cars and taxicabs. The officers are: C. K. Thomas, formerly vice-president and general manager of the Federal Motor Truck Co., New York, president; Cloyd Marshall, formerly with the C. W. Hunt Co., secretary and treasurer; M. D. Herron, sales manager, and Walter Jones, chief engineer and superintendent. The directors include: Wm. S. Thomas, O. S. Platt, Philip F. Donahue and Geo. F. Whitney. The line of trucks will consist of ¾, 1, 1½ and 2-ton capacity.

Bosch Magneto Co., New York City, has recently signed contracts with the Republic Motor Truck Co., Alma, Mich., and Henderson Bros., North Cambridge, Mass., to use Bosch magnetos for the coming season

Knepper-Knight Co., 922-4 David Whitney Bldg., Detroit, Mich., distributor of Soss hinges, Eaco horns, Inland piston rings and Boston gasoline gages, has changed its name to The Knight Co., the latter company having taken over all the interests of Harry H. Knepper. The principal stockholders are William C. Knight and George S. Knight.

New Truck Agencies

Chas. N. Carroll, W. Main St., Meriden, Conn., has taken the agency for the Vim truck.

Twin City Auto Market, 107-9 N. Market St., Champaign, Ill., has been opened by Phillips & Kleinich. Used pleasure and commercial cars will be handled.

Signal Motor Truck Co., Detroit, recently appointed the following dealers: Coast Motor Co., Inc., San Francisco; Jos. Pierotti & Sons, Inc., Oakland, and C. S. Anthony, Los Angeles.

Gramm-Bernstein Co., Inc., Lima, O., has opened an eastern office at 1457 Broadway, at 42d St., New York City, for the sale of Gramm worm drive trucks from 1 to 6 tons capacity.

H. J. Koehler S. G. Co., Newark, N. J., announces the following new dealers: Lincoln Highway Garage, Wrightsville, Pa.; Paul Taylor, Belmar, N. J.; L. E. Stauger, Myerstown, Pa.; Carson-Orcutt Sales Co., Huntington, N. Y.; Thurmont Garage, Thurmont, Md.; N. R. Zimmerman, Doylestown, Ohio; Heller Sales Co., Wapwallopen, Pa.; F. P. Renz, Pana, Ill.

General Vehicle Co., Inc., formerly located at 820 Witherspoon Bldg., Philadelphia, Pa., has moved to 2116 Market St.

Singleton-Hunting Co., general advertising agents, Citizen Bldg., Cleveland, Ohio, has changed its name to the Singleton-Tripp Co.

Federal Truck Co., of Chicago, has moved from 1716 S. Michigan Avenue to new salesroom and service station at 2100-04 Wabash Ave.

The Locomobile Co. of America, Bridgeport, Conn., recently elected the following officers: Raymond K. Albright, president; Andrew L. Riker, vice-president; James T. Roche, vice-president; Frank R. Hickman, secretary and treasurer.

Lefever Arms Co., Syracuse, N. Y., is erecting a two-story addition 41 x 144 ft., which will be devoted entirely to the manufacture of transmissions and transmission gears. This is in addition to the one-story building 60 x 75 ft. also being constructed

Hurlburt Motor Truck Co., New York City, has increased its capital stock from $150,000 to $450,000, of which $350,000 will be preferred, paying dividends of 7 per cent. per annum. With the new equipment, which the company will install, an increased production will be possible.

Hoosier Castings Co., Connersville, Ind., has increased its capital stock to $100,000, and is adding new building 300 by 75 ft. to its present foundry. It is installing a new 30 ton cupola, giving them an added capacity of about three times that of the former output.

The B. F. Goodrich Co. has won the first round in the controversy over black tread tires by a decision just handed down in the U. S. Patent Office. An application by the Firestone Tire & Rubber Co., for registration of a black tread band and red sides as a trade-mark was opposed by the Goodrich company, which claims to possess trade-mark rights in a black tread band used with sides of any contrasting color, especially light gray or white, and also claims to have used the specific combination of black and red on pneumatic tires prior to the earliest date of adoption by the Firestone company. The Examiner of Interference denied a motion by the latter concern to dismiss the Goodrich opposition.

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Pennsylvania Section of S. A. E. Discusses Motor Truck Transportation

ON Wednesday evening, April 26th, the Pennsylvania Section of the Society of Automobile Engineers held a regular meeting, at the Engineers' Club, 1317 Spruce Street, Philadelphia, Pa., Chairman E. S. Foljambe presiding. The subject of the evening was "How Automobile Engineers Can Help in Motor Transport Preparedness," which was presented in the form of a paper by Major Francis H. Lawton, U. S. A., Commissary Department, Governor's Island. In this paper he outlined what the country needs in the way of motor transportation for proper preparedness. He said:

"An infantry division of 22,000 officers and men, together with their animals, consumes daily 175,000 pounds of food, and modern armies are no longer counted by thousands but by millions. You will understand how impossible it would be to secure the necessary number of trucks by purchase or otherwise after war was declared."

The Major said that one and one-half tons was preferred and that three-ton trucks were not suitable, owing to the fact that bridges would not carry their weight, except around the base of supplies, which very often is a large city.

He gave in detail the method of carrying supplies and ammunition to moving troops in the field, and outlined the requirements in pounds and tons of both food and ammunition that must be transported. With animal-drawn vehicles, whose average work is 18 miles per day, it has been necessary to establish refilling points when the troops went beyond that distance. In connection with supplying a division of troops operating 75 miles from a railroad, it has been figured that 654 wagons would be required in addition to the divisional trains, making 780 wagons and 3120 mules in all, merely for carrying the food supply. Comparing this with what could be done with motor transportation, estimating a day's work for a truck at 75 miles (incidentally, the European armies figure 12 miles per hour and 100 miles per day) only 120 motor trucks would be required. He further said:

"We can with 240 trucks extend that distance to 150 miles. In other words whereas 240 motor trucks will extend the radius of activity of the troops to 150 miles, 240 wagons would only extend it 36 miles. On the other hand, when distances are short, as when the army is stationary, the number of trucks can be greatly reduced. A division operating less than 40 miles from the rail-head would require only 30 trucks for the daily food supply, thereby releasing 75 per cent. of the supply train for other work.

It is generally conceded that the trains corresponding to our regimental trains should be animal drawn, while the division trains are best constituted of motor trucks.

Size of Trucks Best Suited

All attempts to adopt any particular type of car or truck for service have proved impractical.

For all-around service the 1½-ton truck has been found most practical.

With the supply column which operates along the main lines of communication, and for use at the advance depots and the bases, it is different; I would unhesitatingly be in favor of 3-ton trucks and even larger when available for this work.

The weak point of the comparatively heavy armored car lies in its dependence on the road conditions and its helplessness before ordinary obstacles, such as ruts and ditches.

The motorcycle has proven generally unsatisfactory, and for messenger and orderly service has been replaced by light two-passenger motor cars.

The motor ambulance is the machine for which the ordinary pleasure car chassis, unaltered, has proved most suitable. The driver and attendant seated beside him should, however, be placed over the engine, thereby allowing the patient to be so placed as to have the whole of his body between the axles.

The continual breaking of radiators is a defect that has been especially noted under the strain of active service conditions.

The most satisfactory wheel is one in which a steel plate replaces the spokes, and where the dual tire is of solid rubber.

Electric lighting has been found more satisfactory than any other form. The feature found most successful in every way was the electric headlight arranged on a universal joint.

You have all been told many times, that in the event of war we must have immediately available 500,000 men for the first line of defense. Organized into divisions, that force would need over 8000 1½-ton trucks for the additional trains, and the main army of defense, when organized, would need many times that number.

The vital question that is before us, the one that you gentlemen must solve, is where and how are we to get those trucks, the men to run them, and the equipment and repair parts to keep them running?

A main army of only two million men would consist of over 80 divisions, and each division would require 18 units, a total of 1440 units of 20 trucks each; how long would it take our factories to furnish this equipment?"

He submitted the following figures, compiled by A. F. Masury, in regard to the saving of motor transportation in ordinary times of peace over that of the present animal transportation.

Average cost of one 1½ ton truck	$2,225.00
Cost of 3 wagons, mules and harness	3,431.31
Saving on initial cost	$1,206.31

Yearly Costs.

1 Motor Truck.

Gasoline	$395.00
Oil and grease	150.00
Tires	488.00
Forward	$1,033.00
Maintenance	270.00
Drivers	548.51
Total Truck Costs	$1,851.51

3 Wagons.

Forage and bedding	1,323.36
Shoeing material	22.50
Veterinary medicine	12.00
Repairs to wagons and harness	234.00
Three enlisted teamsters, wages, rations and clothing	1,028.40
One Sgt. O. M. C., wages, rations and clothing	548.51
Total Wagon Costs	$3,168.77
	1,851.51
Yearly saving by trucks	$1,317.26

He closed by stating again how great is our need of preparedness along this line and what a wonderful part the engineers can play in it.

During the discussion, S. P. Wetherill, Jr., called attention to what was being done in Philadelphia, in regard to reserve corps of trucks of 27 each, all the trucks being of the same make in each corps. The trucks in use in the city have been listed, together with the names of the drivers, and steps are being taken by an organized body to arrange with the owners and users of these trucks for their surrender to the Government on a moment's notice in case of an emergency. For instance, a large user may allow ten trucks to be listed. Of these, four may be called upon. Monthly inspections will be made and when needed, the four in best condition will be taken, together with their drivers.

W. H. Metcalf, Secretary of the Motor Truck Association, of Philadelphia, who is compiling the figures on trucks, stated that he had on his list some 632 available machines at the present time, not counting a large number of trucks which would have to have their bodies removed before they could be used.

The Chair then appointed a committee of three, consisting of S. P. Wetherill, Jr., Nelson S. Pringle and William H. Palmer, to act in conjunction with the National S. A. E. Committee and the Government officials in any way that may be helpful in the preparedness movement.

Leiker & Schueler, Hays, Kans., have dissolved partnership. Carl Leiker will continue in the implement business, and Alex Schueler, Jr., in the auto and gas tractor business.

Service Garage, Thirty-third Street, near Park Avenue, Paterson, N. J., has been bought by Alfred Crist, formerly of the O. K. Garage. He retains his agency for the Dart motor truck.

Larrabee-Deyo Motor Truck Co., Binghamton, N. Y., has elected the following officers: H. C. Larrabee, president; R. H. Deyo, vice-president and general manager; S. T. Macey, treasurer, and I. T. Deyo, secretary.

S. K. Miller, assistant sales manager of the Kentucky Wagon Mfg. Co., and its subsidiary, The Dixie Motor Car Co., has just completed contracts with large distributors in Newark, N. J., and Philadelphia, Pa., for $360,000 worth of Dixie-Flyer touring cars and Old Hickory motor trucks, demonstrator cars for both connections being shipped by express, with stock shipments following by fast freight.

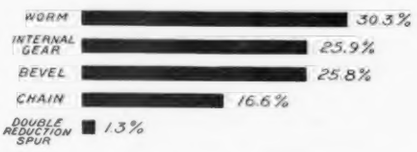
The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

Statistics on Percentage of Various Types of Final Drive on 1916 Models

IN the last issue of the COMMERCIAL CAR JOURNAL, in answer to an inquiry, some statistics were given on this subject. We found, but too late to stop the presses, that certain information in regard to the actual number of internal gear driven trucks now to be placed on the market was lacking. This information we have now succeeded in getting and with it the percentage using internal gear drive is very much higher. The added figures bring the internal gear drive percentage up to 25.9 per cent., almost as high as the worm gear, which is 30.3 per cent. These figures do not take into consideration, however, a large number of units which are now being placed on the market for converting Ford cars into one-ton trucks. About 5000 of these units will be equipped with internal gear drive axles. A large number will also be equipped with chain drive, practically none with bevel gear drive and very few with worm drive. These were not added, as it was impossible for us to get detailed figures in regard to the number of such devices that will be marketed this year. If these devices are included, the worm and the internal gear will stand almost on an equal basis in regard to the number of vehicles being put out in 1916, which will employ these final drives respectively.

Many figures have been compiled on this subject, but are usually based on the models which the various manufacturers are puttin out. These figures we have endeavored to base on the actual number of vehicles to be placed on the market. As this covers 1916, the figures are those given us by the manufacturers, and in a few instances, estimates by us, based on our knowledge of the trade. For these reasons, the statistics here given must be taken as estimates and not considered as absolutely final. However, they give a very good idea of the trend of design with respect to final drive and the accompanying curves, and give a very good idea of the sizes of trucks which are using the various types of drive.

It will be noticed that the internal gear curve does not go beyond the 2-ton model. This does not mean that trucks over 2 tons are not using internal gear, but merely means that we do not have any figures for the 2½, the 3½, the 4 or the 5-ton sizes. The figures for the 3-ton and the 6-ton are marked.



Diagrams Showing the Percentage of Final Drive on 1916 Trucks

These figures do not include units for converting Ford cars. If those were included, the internal gear would be up to, or perhaps slightly exceed the worm. It is noticeable that the double-reduction spur gear, which is so largely used in Europe, is confined almost exclusively to one make of truck in this country.

It will also be noticed that the bevel gear drive is very largely used on the small models, dropping down very perceptibly when 1500 lbs. capacity is reached. This curve stops at the 1½-ton size. There are undoubtedly a few trucks of larger sizes using bevel gear drive, but they are isolated cases and no large quantities are built.

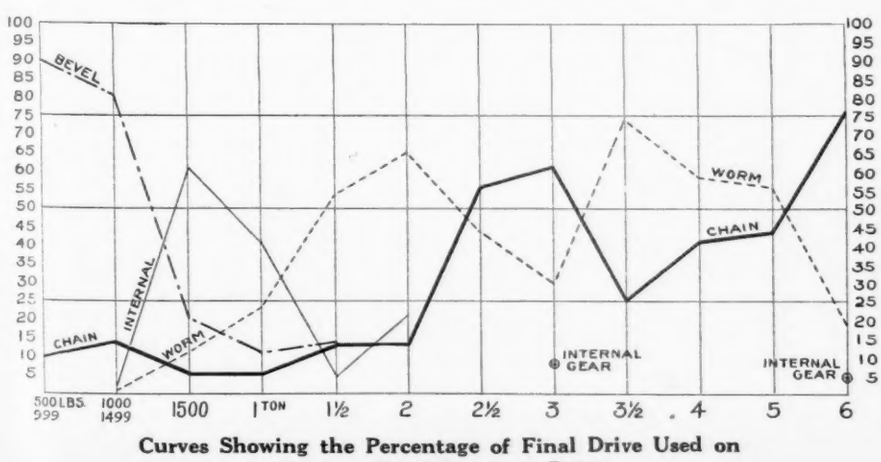
The chain curve shows that this method of drive is used very little on the small trucks, up to 2 tons in capacity, but from 2 tons on up to 6 tons, chains are much in evidence.

The worm drive begins practically at 1000 lbs. and extends on upward in gradually increasing quantities to 2 tons. There is a drop on the 3-ton size and a large increase on the 3½-ton size and the curve gradually drops down on the 4, 5 and 6-ton sizes.

It is very noticeable that from the 3½-ton sizes up to 6-ton, the worm and the chain do exactly the opposite of each other, the worm decreasing and the chain increasing almost in the same proportion. The internal gear also begins at about 1000 lbs., increases very rapidly on the 1500-lb. models, which use more internal gear than any other size; decrease at the 1½-ton size and increase again at 2 tons.

The increase in the use of the worm has been spoken of. The tremendous increase in the use of the internal gear drive has not been recognized as fully. These figures, however, show that the internal gear drive has made a remarkable advance during 1916—undoubtedly the most rapid increase in the use of any one type of final drive made this year.

The totals are interesting, showing the number of trucks that will be built in 1916 of different sizes, the complete figures showing about 109,433 as the probable output for the coming season, of which the worm represents 33,175; the internal gear, 28,315.



Curves Showing the Percentage of Final Drive Used on Various Sized Trucks for 1916

For information, see text

STERLING BRANCH IN CHICAGO CHANGES ADDRESS

The Sterling Motor Truck Co., Chicago, Ill., a direct factory branch of the Sterling Motor Truck Co., Milwaukee, Wis., recently changed its location from 2637 Cottage Grove Avenue, to 1324-26 South Michigan Avenue. The new location of the Sterling Co.'s Chicago Branch is just at the beginning of Automobile Row, on Michigan Boulevard. The new establishment is 60 x 180 ft., the display room being sufficient to exhibit all five sizes of Sterling trucks on the same floor. The service station in the same establishment will include every facility for giving day and night service to Sterling customers in its territory. W. F. Wittenberg is the Branch Manager, and H. L. Scharlach, Secretary and Sales Manager.

The selling of the Sterling automatic pump trucks to contracting and building trades in Chicago and the State of Illinois is being handled by the Chicago Builders' Specialties Co., 11 South La Salle Street, G. A. Whitehead, Sales Manager. This contractors' supply organization maintains a force of six traveling men in Illinois, Iowa and Michigan.

H. A. Dougherty, for the past seven years president of the Overland Automobile Co., Kansas City, has taken the distribution of Republic trucks in that city.

H. J. Koehler S. G. Co., recently placed the following agencies: Joplin Commission Co., Joplin, Mo.; P. J. Needham, Scranton, Pa.; Kingston Taxi Service Co., Kingston, N. Y.; Craig Motor Car Co., Uniontown, Pa.; Graham Clements & Sulton, Chestertown, Md.

The CCJ has most readers because it gives most information

Question and Answer Department

PISTON DISPLACEMENT OF 425 CU. IN. NOT NECESSARY

A contract has recently been entered into by our city under the attached specifications for providing five motor sprinklers for a period of four years. The successful bidder will receive $29.42 per day of two 8-hour shifts for each truck. It has been urged that the requirement that the piston displacement be at least 425 cu. in. seriously limited competition. We are also taking the liberty of submitting these questions to you:

1. Are the specifications reasonable, fair and intelligent, as regards the securing of good service to the city from motor sprinklers?

2. Is the price of $14.71 per 8-hour shift, which includes truck, driver and all supplies, working two shifts per day, a fair and reasonable price for service of this character?

3. Is horsepower an absolute function of piston displacement?

4. In your opinion could trucks with less than 425 cu. in. piston displacement, but designed for heavy duty, successfully carry this double duty load, proper engineering being, of course, granted?—S. C. S., Secretary.

ANSWER.

A piston displacement of 425 cu. in. looks to us altogether too large to be necessary. Trucks all the way from 2 tons to 6 tons are used as sprinkling and flushing trucks. The piston displacement of the ordinary four-cylinder 3-ton truck is in the neighborhood of 235 to 240 cu. in., for instance, a truck of 4 x 4¾ in. is 238 in. displacement. A 5-ton truck usually runs about 260 cu. in.; for example, 4 x 5¼ in. truck has a piston displacement of 263 cu. in. Six-ton trucks, as a rule, do not have any larger engine than 5-ton trucks, it being a matter of gear reduction, so that a piston displacement of anywhere between 250 and 275 would be amply large for all purposes.

2. A charge of $14.71 per 8-hour shift, including truck driver and all supplies, does not seem to be unreasonable.

3. Horsepower, other things being equal, is a direct function of the piston displacement. However, engines vary so much that two engines having exactly the same piston displacement may differ considerably in their horsepower. The timing of the valves and many other things enter into the actual horsepower.

4. We think there is no question but what trucks properly built and handled of 260 cu. in. piston displacement could do the work satisfactorily.—Editor.

POINTS OF ADVANTAGE OF WOOD WHEELS

To the Editor:

I notice in your March number, an article under head of "Design & Construction" by a member of the S.A.E. on the subject of Motor Truck Wheels. I have read same very carefully, and while confessing that my technical knowledge of the construction of metal wheels is somewhat limited, it is also fair to say that the writer of the article knows as little or less about the construction of wood wheels.

There are very few, if any, wheels made of strictly second growth stock, as practically all of the hickory used in the construction of wheels comes from the Southern States, and while not what would be termed forest timber, neither is it strictly second growth. To specify that wheels are made of strictly second growth stock is misleading.

In constructing wheels with 2 in. spokes or less, it is good practice to use hickory for the spokes and rock elm, tough white ash, oak or hickory for the felloes. Spokes larger than 2 in. could be made of hickory or oak and where very large, say 3½ in. to 4½ in. wide, good tough rock elm or second growth white ash spokes could be used to advantage, and from experience we know they will stand up as well as hickory or oak.

Of a necessity, the grain in the spoke must run lengthwise as it is utterly out of the question to produce a spoke with the grain running any other way. There are two causes for shrinking of spokes that he mentions and neither one have anything to do with the quality or kind of timber used. Either the stock has not been thoroughly dried or construction that had not sufficient compression, and all the interlocking spokes or keys in the world will not prevent the shrinking. To convey the impression that a certain make of wheels or the use of keys will eliminate this feature, is doing an injustice to other responsible wheel makers. A wood wheel properly constructed of strictly dry material will give as much service as any metal wheel of same capacity.

When purchasing agents once become educated to the point where they forget price and purchase quality, you will hear very little complaint of wood wheels going down and where they at the present time purchase metal wheels that are designed by the manufacturers, on the other hand the wood wheels are made to specifications furnished by the engineering forces of the various truck manufacturers.

Taking up the matter of superiority or advantages possessed by steel wheels over wood wheels, wish to say that engineering practice teaches us that a wheel manufactured with the hub, rim and spokes integral, has not the flexibility and shock absorbing qualities that a wood wheel has. Furthermore, a wood wheel not being so rigid as a metal wheel, road shocks are not transmitted to the vital parts of the truck. Tests made at the University of Michigan on wooden truck wheels are evidence of the resisting qualities as to crushing strain and side thrust.

It is conceded that the initial cost of metal wheels is greater than wood wheels and when the truck is sold, the manufacturer is not obliged to replace wheels broken through accident. It is then up to the owner to replace either metal or wooden wheels. Should a metal wheel give out, it means the user must purchase an entire new wheel, while with the wooden wheels there is still the salvage of steel band and hub, which can be used on a new wheel, making the second cost of wheel comparatively small as against the price of a complete new metal wheel.

The writer has made the construction of wooden truck wheels a study and was one of the committee that established the standards under which wheels are now made.

In conclusion, wish to add, though Mr. Shafer has not willfully misrepresented the facts, he has through his limited knowledge of wood wheel construction, made statements that are in a nature misleading to the uninformed.—A. D. Smith, St. John's, Mich.

Keystone Vehicle Co., builder of hearse, ambulance and limousine bodies, is enlarging its quarters at 26 West Swan Street, Columbus, Ohio.

Standard Motor Car Co., distributors of Lexington-Howard pleasure cars and Republic trucks, has moved to 740 Commerce Street, Tacoma, Wash.

Props-Dunn Truck Co., East Washington Street, Indianapolis, Ind., has been taken over by the Hoosier Truck Co. The Smith Form-A-Truck will be handled.

The Government of Switzerland has decided to adopt 2 types of subsidy trucks, a 2-ton model for mountain service, and a 5-tonner for service in the level country.

Unique Body on Trunk Maker's Car

This illustration shows the delivery body attached to old chassis and used by Boyd, Boyd & Boyd, trunk makers, of Pittsburgh, Pa. The body will accommodate twelve trunks and is used to deliver goods to the several retail stores of this company. It is useful and is also a great advertisement.

The CCJ has most advertisers because it gives them biggest returns

Satisfactory Kerosene Automobile Engine Possible

By PROF. C. E. LUCKE, Columbia University

Editor's Note—No one man has perhaps had more experience or made more tests on burning low grade fuels in automobile type engines than Prof. Charles E. Lucke, of Columbia. His discussion, therefore, at the April Metropolitan Section S. A. E. meeting on Mr. E. S. Foljambe's paper on the fuel situation is of special interest and value.

THE subject of devising mechanical appliances for handling these various heavy fuels is one that is more or less familiar to me through years of studying of the scientific data and physical constants involved in connection with engine performance. As a result of that study, involving the examination of some hundreds of schemes and many actual kerosene automobile and other type of engines, I assure you that there is no fundamental difficulty whatever in producing a satisfactory kerosene automobile engine. Such an engine will not be materially different from the engine we now have in use. It is possible to devise special engines almost without end, but it is inadvisable and inexpedient to do so.

Automobile service is the most difficult of all services for kerosene to perform in the internal-combustion engine field. I have long believed in the possibilities, I have been a firm believer in the certainty that it would come soon, and have been surprised only by the delay.

The adoption of kerosene-burning appliances depends, first, upon willingness on the part of the manufacturers and users to take a little trouble. I do not mean necessarily trouble in use, but the trouble incident and necessary to the change. Kerosene as a material is fundamentally different from gasoline. You cannot expect to do exactly the same things with it and get the same results. You may not get in the same type of engine the same horsepower per cu. ft. of displacement, but what of that? You may not be able to start the first turn of the crank, but what of that if you can start at all, without unreasonable delay? Willingness to take a little trouble during the change from the gasoline to the kerosene, from the familiar to the unfamiliar, will result in a short time in as great an appreciation by all concerned of the new as we now have for the old.

Patent Situation a Difficulty

Assuming that the willingness is here, the next difficulty is the patent situation. There are thousands of patents on all sorts of devices in this field in this country. Those patents are in every case defective, each one of them, in some particular. In other words, if one were to use the patentable devices that are available today he could make not only one kerosene automobile engine, but a hundred different ones. But to do that would require the adoption of element A from No. 1 patent, element B from No. 2 patent, and so on. Nevertheless that must be done to some extent. The patent situation is most complex, but I believe that nearly all the elements capable of being invented and worth anything if brought together have already been invented. The state of the art today is such that design on sound scientific thermochemical principles is required, not such a great deal of invention, but considerable inventive selection.

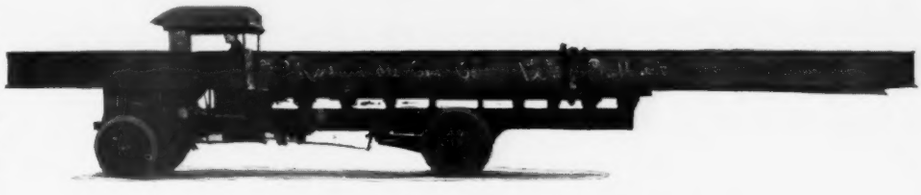
Assuming willingness, assuming we are able to overcome the patents situation and reconcile inventors and manufacturers, then the problem is not solved until you have correctly proportioned the necessary parts and have eliminated that large number of supposedly necessary parts that really are not necessary. The problem of making a mixture of kerosene vapor and air that will behave properly in an automobile engine is not at all a difficult one from the scientific standpoint. The problem for this kind of engine differs from the problem for other engines in two fundamental respects; first, the engine is a variable-speed, variable-power, variable-heat using and generating machine, in which the variations are subject to no foresight or predetermination. Second, it is a multi-cylinder engine, and the present tendency appears toward more multiplicity of cylinders instead of less, though I hope that that will turn around backwards some day.

The making of a mixture of kerosene and air that can be supplied from a single feeder or generator through a header and branches to a large number of cylinders, distributing to each one equal shares of a vapor and liquid, so that each one gets exactly the same sort of mixture, and to do that thing under all conditions of weather, all conditions of rate of flow, all conditions of air and jacket temperature, and as well do it throughout the entire range of densities of kerosene on the market today, may seem a difficult problem; but it is one of those difficulties that is not at all insuperable once you understand its scientific basis.

In the first place, such mixtures are vaporizable, or are driable, to use a steam term. A measured ratio of kerosene and air can be brought together—measured in combining proportions, let us say—can be brought together and no matter what the kerosene density, if the temperature be raised to a suitable point the mixture will dry and distribute through any number of branches perfectly. Such distribution is no more difficult than the distribution of gas through pipes to various chandeliers. Therefore the conditioning of the mixture, assuming a suitable proportioning device be available, is entirely one of applying a suitable amount of heat to attain a suitable mixing temperature.

Now, the attaining of that temperature is not a delicate operation, yet it must be kept within limits. The temperature may not be too low or else excessive liquid will be present and disturb the distribution through the branches of the same proportion of air and fuel. The temperature may not be too high or else pre-ignition will be promoted. But the range from too high to too low is not much less than one hundred degrees, according to my experience. So I say fundamentally, from the scientific standpoint, one has only to devise means, first, to control the proportions suitably; second, to control the heat supply or temperature of the mixture; and then the machine will run. It will not perform exactly the same as the present gasoline engine. It will not be identical, engine for engine, but car for car you could not tell the difference.

In controlling the temperature or in getting the mixture in a suitable condition with reference to temperature, the influence of intimacy and homogeneity is a factor that is often overlooked. So long as the liquid and the air are intimately mixed, so long as the liquid, for example, is almost as fine in its liquid state as the molecule itself, then as the vapor comes off it immediately finds itself in the presence of the air it requires, and there is the least resistance to further vaporization by the pressure of the vapor already formed. I have seen, by sighting through a glass tube, a kerosene mixture that was intimately mixed become perfectly dry as it was on its way to an engine at a little less than 300 deg. F.; I have seen other mixtures that were not intimately mixed escape at over 500 deg. F. and still be wet and unvaporized. This is a convincing proof of the importance of an intimate mixture in controlling the temperature required to produce dryness. That temperature should not and need not be necessarily high. In round numbers, 250 deg. F. will make the mixture dry enough to distribute through any ordinary header; 300 deg. will make it dry enough to distribute through any sort of header, however bad you are able to make it; and close to 200 deg. may be made to answer in a really good header if the mixing is thorough.



Packard Handling Cumbersome Load

Richard DeCou, Philadelphia dealer in iron and steel, has solved the problem of handling a hangover without a regret. The illustration shows what is meant. Mr. DeCou had loaded his four-ton Packard chainless truck with two big I-beams, each more than twice as long as the wheelbase of his vehicle. The beams are 42 ft. 8 in. long and, at 65 lbs. to the foot, weigh 5547 lbs. Judicious placing of the load gave the correct distribution of weight and the truck was able to make the delivery at top speed.

The CCJ leads in circulation, advertising and prestige

DO YOU KNOW THAT—

New Jersey now has more than 11,000 commercial cars.

There are over 400 motor buses in operation in Milwaukee, Wis.

The consumption of crude rubber in 1915 was in the neighborhood of 90,000 tons, while the production of all grades of manufactured rubber merchandise is estimated at 140,000 tons.

With a view to recruiting young men for army service, Uncle Sam is training them to drive motor trucks. This instruction takes the men into various manufacturing plants for a period of three months.

According to figures compiled by the Timken Detroit Axle Co., out of 157 builders of commercial cars in this country, three-fifths or 91 of them build trucks equipped with worm drive.

Vim Motor Truck Co., Philadelphia, Pa., has also adopted the Packard anti-hyphen scheme and has notified its employes that those men who fail to take out naturalization papers will not be advanced to higher positions.

Holland has prohibited the exportation of rubber, and it is anticipated that this measure will cut off exports to Germany. Great Britain will not offer any further interference with shipments of rubber to Holland.

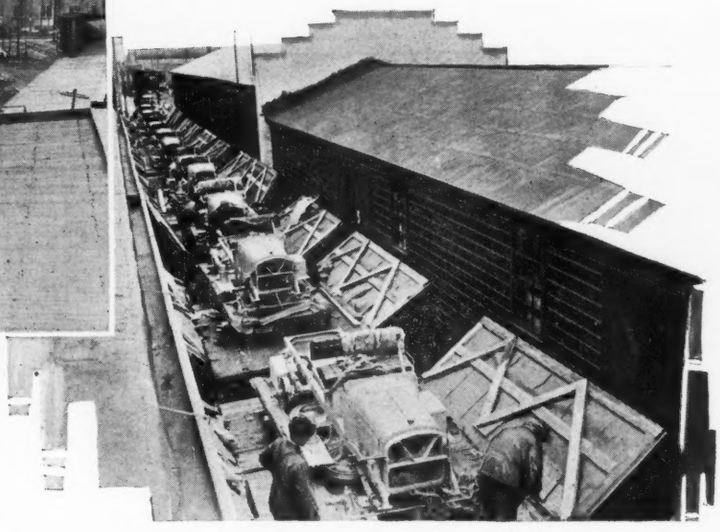
A new alcohol for motors with a specific gravity of from 90 to 95 degrees is said to have been discovered by Baron von Low, of Germany. It is claimed that the best possible results are obtained from mixing this spirit either with benzol or gasoline in the proportion of 1 in 4, 1 in 5 in warm weather, or even 1 in 6. Only a slight adjustment is necessary in the carburetor.

Exports of trucks increased nearly sevenfold from 1914 to 1915, from 3430, valued at $8,985,756, to 22,082, valued at $59,834,246. In 1913 only 1009 commercial cars, valued at $1,686,807, were exported. The increase in two years amounts to 3447 per cent.

The Dillon Bill, providing for the compulsory use of the metric system, has been introduced in Congress, and, according to the bill, after July 1st, all persons selling goods by any other weights or measures than those of the metric system shall be guilty of a misdemeanor. Frederick A. Helsey, who led the fight against the metric system 10 years ago, is again going to lead the opposition to it.

Scenes From Across the Water

On the left is shown a convoy amidst the ruins of a village near Verdun. The illustration on the right shows French gunners loading an anti-aircraft gun on a motor transport.



Shipments of Republic Trucks to Bordeaux, France

Attention is called to the bottom of the crate, on which the trucks are placed while on the shipping platform, and are then skidded on to the platform of the flat cars. In the right-hand photograph is shown a shipment being made ready for Adelaide, Australia. It will be noticed that the sides and ends of the crate come already built up, and it is simply necessary that they be assembled. It will also be noticed that the entire inside is lined with paper and that the front of the truck, that is the radiator, is protected by a special framework.

The Advantages and Necessity of the Commercial Car in Connection With Army Maneuvers Are Conclusively Being Proven in Mexico

On the left is seen a truck and trailer hauling munitions and supplies. The center illustration shows one of the "juice" wagons which supplies gasoline to the army trucks. The remaining illustration shows an auto truck train following the trail and loaded with supplies for the troops in the interior

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

THE COMMERCIAL CAR JOURNAL

Entered as second-class matter at the Post Office at Philadelphia Pa. under the act of March 3, 1879

Vol. XI PHILADELPHIA, MAY 15, 1916 No. 3

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets Philadelphia, U. S. A.

JAMES ARTMAN, President C. A. MUSSELMAN, Treas. and Gen'l Mgr.

GEO. H. BUZBY, Vice President A. H. VAUX, Secretary

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Other Countries in Postal Union, including Canada ..... One Year, $2.00

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TENDENCY TO COMBINE SHOWN IN AUTOMOBILE INDUSTRY

COMBINATIONS in the automobile industry seem to be the order of the day. There have been some large mergers in the past, but much larger ones are rumored for the future. As usual, those who are supposed to be in the merger flatly deny the rumor, or else are silent on the subject. Although the daily papers are filled with details of these big combines, we are not giving such information to our readers until same can be corroborated and until we are sure that it is authentic.

The present merger, although it does not affect the truck industry especially, still as it includes various parts makers, might indirectly have an influence, and the shakeup among the officers and employees in the merging companies would also, if the mergers become effective, have an influence.

That there is a decided tendency for combinations of interests cannot be denied. It is a natural tendency. Competition is growing keener each year and the effort to produce serviceable vehicles at the minimum cost is alone sufficient to bring manufacturers together. Quantity production seems to be the answer when low cost, together with quality, is desired.

Mergers may, therefore, be expected as a natural development as the industry grows older. We do not, however, believe that the automobile industry will ever simmer down to five or six companies, but that there will always be a comparatively large number of makers, each embodying their own individuality in their product.

WILL STARTERS BECOME STANDARD EQUIPMENT ON COMMERCIAL CARS?

STARTERS on delivery vehicles are more noticeable each year. Thus far the inclusion of the starter as standard equipment has been confined very largely to vehicles under one-ton capacity. There are, however, a few exceptions of large trucks which have been fitted for several years with starters.

A starter on a pleasure car may be considered a luxury, although the average motorist now considers it a necessity and demands it. As the grade of fuel placed on the market is less and less volatile, the difficulty of starting increases. This means that truck drivers will allow the engine to run idle even more than in the past.

One well-known firm has figured it out that a starter on a truck is not an economy from the fuel cost standpoint, on the basis that taking into consideration the first cost of the starting outfit, together with the depreciation of same, it is claimed that no material saving is shown over the cost of running the engine idle on an average of five hours per day. Let us, for the sake of argument, grant this contention, as the extra cost in any way deterred the introduction of the starter and its establishment as standard equipment on pleasure cars. It is well known that it has not. This, however, may be due to the demand of the owner driver for greater convenience, while, with a truck, a hired driver is supposed to be able to crank the engine, if necessary. Nevertheless, we believe that the starter will become more general in its use on trucks, particularly those used for delivery purposes, where starting and stopping is done many times a day.

Even if the gasoline cost were the same as the initial cost and depreciation of the outfit, there would still be an advantage in being able to start the engine instantly from the seat, in case of stalling in traffic or in street car or railroad tracks. In cold weather, engines are left running at greater speed and the fuel consumption is greater than in hot weather, so that the average cost may be higher than that figured by those who say there is no saving.

With the present high cost of fuel, even that consumed with the engine running idle becomes a decided feature during a year and may even run as high as the ordinary repairs of a small truck.

There is another feature which must be taken into consideration. The driver of a modern delivery vehicle catering to the retail trade often has to enter private homes and must always go up the steps and on to the verandas. Modern housewives are just as fussy about mud as they ever were and do not care to have their place tracked up by the muddy boots of the driver who has been in the street cranking an engine.

Again, there is the wear and tear and added depreciation of the engine which, although slight, as the engine is idling, still the valves seat themselves with almost the same force as

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

when the engine is doing work. The wear on the cams and camshaft is the same.

In delivery service, it is not at all unusual for a car to be standing idle fully 50 per cent. of the time, which means that, under these conditions, the engine's idle running would be equivalent to one hundred and fifty eight-hour days during the year.

We hope to see more starters on commercial cars. We believe that one of the inherent difficulties and disadvantages of the gasoline engine is the inability to start itself and that starting should be a part of the engine itself incorporated in the original design. Until this is done, there is something lacking and we do not believe that the automobile engineer will be content as long as the gasoline engine is defective in any point.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Commercial Car Journal, published monthly at Philadelphia, Pa., for April 15, 1916.

State of Pennsylvania,
County of Philadelphia, ss.:

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMERCIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:
   Publisher, CHILTON COMPANY, 49th and Market Streets, Philadelphia, Pa.
   Editor, James Artman, Narberth, Pa.
   Managing Editor, E. S. Foljambe, Drexel Hill, Pa.
   Business Manager, C. A. Musselman, 4203 Pine Street, Philadelphia, Pa.
2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock.)
   James Artman, Narberth, Pa.
   George H. Buzby, 4412 Walnut Street, Philadelphia, Pa.
   C. A. Musselman, 4203 Pine Street, Philadelphia, Pa.
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also, that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES ARTMAN, Editor.

Sworn and subscribed before me this 27th day of March, 1916.

GEORGE H. SHEVLIN.

(Seal)

(My commission expires April 1, 1917.)
Form 3526-Ed. 1916.

Steel and Rubber Markets

Steel Demand Greater Than Ever

The problem with the steel mills today is not to get orders but produce sufficient quantities to meet the orders now on the books. Some mills are behind on shipment to the extent of six weeks. The demand for shell steel is greater than ever. Domestic business is maintaining a very active pace. Rail buying continues to be one of the features of the domestic market. Over one million tons of rails were bought during April. Quotations on May 9 were:

Steel Products Prices.

Bessemer billets, per ton, mill	45 00 a ....
Open hearth, per ton, mill	45 00 a ....
Sheet bars, per ton	45 00 a ....
Forging billets, per ton, mill	69 00 a ....

The above prices are at tidewater, in carloads and larger lots. For quantities less than 2,000 lbs., but not under 1,000 lbs., $2.00 per ton additional is charged, and less than 1,000 lbs., $8.00 per ton additional.

Sheets.

The following prices are for 100-bundle lots and over f.o.b. mill.; smaller lots are $2.00 per ton higher:

Blue Annealed Sheets	Cents per lb.
Nos. 9 to 10	2.90 a 3.00
Nos. 11 and 12	2.95 a 3.00
Nos. 13 and 14	3.00 a 3.10
Nos. 15 and 16	3.10 a 3.20
Box Annealed Sheets, Cold Rolled—	
Nos. 22 and 24	2.70 a 2.75
Nos. 25 and 26	2.75 a 2.80
Galvanized Sheets of Black Sheet Gauge—	
Nos. 10 and 11	4.00 a 4.25
No. 12	4.10 a 4.35
Nos. 13 and 14	4.10 a 4.35
Nos. 15 and 16	4.20 a 4.45
Nos. 17 to 21	4.35 a 4.60
Nos. 22 and 24	4.55 a 4.80

Above prices are for Bessemer stock. For open-hearth stock $2.00 per ton advance is charged.

Iron and Steel at Pittsburgh.

Bessemer iron, Valley furnace	21 00 a21 50
Bessemer steel, f.o.b. Pittsburgh	45 00 a ....
Skelp, grooved steel	2 35 a 2 45
Sheared steel skelp	2 45 a 2 50
Skelp, grooved iron	2 70 a 2 80
Sheared iron skelp	3 00 a 3 10
Ferro-manganese (80 per cent.) seaboard	175 00 a 400 00
Steel, melting scrap	17 25 a17 50
Steel bars (contracts)	3 00 a ....
Black sheets, 28-gauge	2 85 a 2 95
Galvanized sheets, 28-gauge	5 00 a 5 15
Blue annealed, 10-gauge	2 65 a 2 75
Tank plates, ¾ and heavier	3 75 a ....

Rubber Prices Drop

A further decline in the price of crude rubber was noted since our last report. A strike of machinists in Akron and Youngstown factories brought about a break in prices on May 3. London prices also dropped. The low price level was followed by heavy buying. Quotations on May 9 were:

Para—Up-river, fine, per lb.	69 a 71
Up-river, coarse	53 a ..
Island, fine	63½a ..
Island, coarse	33 a ..
Caucho, ball, upper	53½a ..
Caucho, ball, lower	51½a ..
Cameta	37½a 38
Ceylon—First latex, pale crepe	73 a 74
Brown crepe	71 a 71½
Smoked sheets	72 a 72½
Centrals—Corinto	49 a ..
Esmeralda	48 a ..
Guayule	45½a ..
Balata, sheets	49 a 50
Balata, block	49 a 50
African, Massai, red	.. a ..

Domestic Scrap Rubber.

Tires—Automobile	5¾a 6
Bicycle, pneumatic	3¾a 4¼
Inner tubes, No. 1	29 a 30
Inner tubes, No. 2	12½a 13
Red	13 a 13½

Wichita Falls Heavy-Duty Truck, Used by Paving Department of New Orleans

The CCJ has most readers because it gives most information

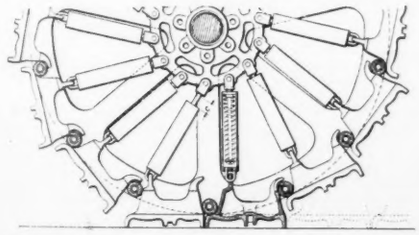
A CHILD OF WAR

By A. M. LEONI, M. E.
Member American Society Mechanical Engineers

THE problem of transporting over all sorts of grounds and roads heavy guns and supplies, confronted by some of the European Powers at war, could certainly not have been solved by the conventional motor truck, equipped with the conventional driving wheels, even when all four were power driven.

Germany could only bring to the doors of Liege and Namour her famous 420 millimeter mortars with the aid of powerful tractors equipped with caterpillar crawlers, and Italy brought up to the top of the highest peaks of the Austrian front her 305 millimeter guns with the aid of specially constructed tractors, equipped with an entirely new type of driving wheel, invented by two Italian engineers, Messrs. Pavesi and Tolotti, the inventors of another type of traction wheel, known as the "Pavesi-Tolotti Spade Wheel" for power-plowing outfits and farm tractors.

The "Pavesi-Tolotti Spade Wheel" met with an amazing success in Europe and South America, for it solved one of the hardest problems of agricultural engineering, that of the deep plowing with small and economical machines, and now this new "Military Wheel," invented by the same man, has met with equal success, for the Italian army, after a trial order of one hundred and fifty tractors, placed a repeat order for three hundred and fifty more, a total of five hundred machines.



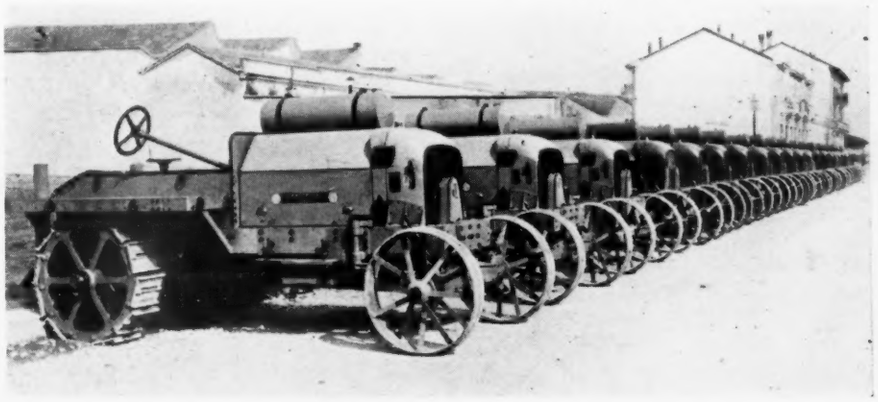
Diagrammatic View of the "Pad-Track" Wheel

These "Military Gas Locomotives," as they are called in Italy, are tractors of special design operated by four-cylinder engines of the heavy duty, automobile type, developing 50 h.p. at 800 r.p.m. The gears are arranged for two speeds forward and reverse or both speeds, these being 2½ and 5 m.p.h. The weight of these machines is in the neighborhood of 10,000 lbs. and, on low speed, they develop just about that much draw-bar pull, which proves that the inventors have attained—with their special wheels—a result which is absolutely unusual.

This most unusual result has been made possible because of the special drivers used, which belong to the class of the "Self-laying Track," somewhat similar in effect to the caterpillar crawlers, with the difference that they afford considerably larger diameters, while occupying less room.

These "Pavesi-Tolotti" wheels might be called "Pad-Track" wheels, to better conform to the American idea of nomenclature, and to coincide with the initial letters of the inventors' names. The accompanying illustrations give a clear idea of the way these wheels are built and operated, and being self-explanatory, do not require much description. These wheels are all steel, and that the wheel proper rolls, with its broad rims, over an endless track, formed by the successive laying down over the ground of the said "pads," which offer to the wheel rims comparatively flat and smooth paths or "tracks." These pads are held in place, around the periphery of the wheel, by special springs, of dirt-proof construction, hanging from a disk fastened to the outside of the wheel-hub and are laterally guided by the same rims of the wheel. These pads do not articulate with the wheel rim, but are only held in place in such a position that they are bound to successively lay down over the ground without causing any relative movement of their cleats as to the ground; therefore, without loss of power from this cause, nor unnecessary wear and without damage in the least to the road. The friction of the wheel rims over the "Pad-Tracks" certainly would not be sufficient to give any pull worth speaking of; but the pull is secured otherwise by the friction of the "pads" themselves over the ground. These pads offer a friction area, parallel to the ground, much greater than that offered by the radial friction of the largest conventional truck driving wheels, while the power is transmitted through the reaction created in the wheel by special bodies, set around in its periphery, which bodies are all the time engaged with corresponding

The "Pavesi-Tolotti" Wheel



Five Hundred of These "Military Gas Locomotives," Fitted With "Pad-Track" Wheels, Are Used by the Italian Army

The "Pad-Track" Wheel Tractors Perform Equally Well Under Any Road Conditions

The CCJ has most advertisers because it gives them biggest returns

bodies, integral with the pads. These bodies in the wheel are broad steel rollers, case hardened and ground, and those in the pads are profiles or reaction surfaces of the width of the rollers, which profiles reproduce the involute curves described by the outside surface of the said rollers during their cycloidal movement in the wheel. These involute curves being two, that is, one for the forward movement and one for the backward movement, are necessarily both reproduced in the pads.

There being an endless, close-pad track, laying at all times over the ground, and there being at least one of the rollers also at all times thrusting against the corresponding reaction surface or pad profile, it naturallly follows that the movement of the wheel is "uniform" and the transmission of the power continuous.

These conditions, positively secured, are responsible for the high efficiency of this type of driver. This wheel is applicable to heavy duty vehicles other than for military purposes, such as for use in mines, in plantations, in lumber and brick yards; in fact, in all contracting work where a heavily-loaded vehicle is asked to go over all sorts of grounds and roads.

Facts have proven that the Italian military truck-tractors, equipped with these wheels, have been able to traverse the paved streets of Milan, hauling a train of 17 trailers loaded with 500 troops, or five wagons carrying each 20 tons, without the slightest injury to the pavement. They have also been able to haul the heaviest guns over mountain roads and supplies over the stony beds of the Isonzo River—all this with an available 50 h.p. and wheels only 37½ in. in diameter, with pads of 12 in. face.

From the Notebook of a Truck Salesman

This Resourceful Man Kept Tabs on His Live Stories and Filed Them in a Little Reference Book. The Book Itself Was Used to Convince Prospects

By W. LIVINGSTON LARNED

Electric Beats Competitor by a Special Early Morning Service.

Small farmer in northern part of New York State made specialty of lettuce. Confined his attention almost exclusively to head and leaf lettuce. Was known to be an expert at the culture of the green. Struggled along for five years without making amount of profit his efforts earned. Stiff competition in markets; especially the larger ones. Installed one electric to take place of four horses and two wagons. Had man up at four o'clock and reached customers in smaller towns at a very early hour. Was in before truck gardeners from surrounding farms began to appear with competitive stuff.

Lettuce delivered with dew still on.

Had sides of electric painted light buff against which was superimposed a big head of very fine green lettuce. Used the caption, "Lettuce Picked An Hour Ago." Built up increased trade almost from the first. Did excellent business with summer hotels. Lived up to his slogan and made several deliveries a day. It was soon known in his territory that he made these extra trips and that his greens were extra fresh.

Great saving of time, too. Will add two more electrics this coming summer, and is using one to "fill in." His son delivers milk from their dairy of six cows. Quick, clean and dependable haulage, done in the neatest sort of way.

Made a Business of Doing Trucking for Many Small Farms.

In radius of thirty-eight miles in Connecticut off beaten track of railway service, there were some twenty small farms, raising all sorts of garden truck. No automobile trucks in use in the district. Individual farms not large enough to support adequate delivery service. Adjacent markets and within limited radius.

Two brothers, with small capital, bought battery of three motor trucks. Bodies painted uniform color with panels for adjustable sign plates.

Undertook delivery for the farms. Name plates specially painted and slipped into place when work was being done for that particular client. A permissible subterfuge. Impression given markets that farm had its own delivery truck.

Plan met with instant favor.

Trucks busy night and day, brothers driving two and employing drivers at reasonable cost for other machines. Sometimes motor would need make one trip only for a farm. Crated berries, load of cucumbers, etc.

Advantage to farms, inasmuch as expense of truck was in force when work was to be done only. No waste of any sort. Friendly feeling, too, between various farms. Kept strict books, and arranged "dates" well in advance. Work of car was mapped out on schedule order. Profits from this "chain of haulage" surprisingly large.

Squab and Broiler Farm Builds Up Splendid Business in House-to-House Delivery.

New Jersey "Gentleman Farmer" specialized in poultry. Went into chicken raising on extensive scale with white leghorns and after fighting down weazels and skunks, did well. Also squabs. Cleaned and prepared for market on his place. Encountered great difficulities in New York market. Found conditions in unhealthy and congested shape. Much petty "grafting." Competition unusually keen. Cutthroat wholesale and retail methods. When the season closed, there was practically no man's sized profit in it.

Greatly discouraged but health would not permit any change to city. Friend suggested another scheme. It involved the purchase of two motor trucks.

Ready market for small orders in house-to-house canvass. Circular letters sent out. Small advertising campaign. Broilers and squabs delivered to the door, a home proposition. Every morning deliveries. Goods fresh and sweet, killed and dressed same morning. Fancy prices with people showing marked preference for this scheme over doubtful markets. Fine business built up. Second year two more trucks and garden stuff added.

Paying well. The success of this scheme entirely dependent upon auto delivery. Any other form of haulage out of the question. Much ground covered at a minimum cost. Has his own little concrete garage and repair shop is part of it. Gasoline bought by barrel and stored on grounds.

Trucks Helped Develop Valuable Farming Section.

Great tract of undeveloped land near Lake Wonponset, Conn., few miles from Bantam and Litchfield. Boys' camp, of two hundred, firmly established on the lake, hotels in vicinity, scenery very beautiful. Climate admirable.

Owner of property had never been able to induce farmers to settle on land. Not near either railway. Litchfield not easily accessible by carriage or wagon. Bantam too small to interest.

Main objection raised by farmers and poultryman—transportation difficulties. Too hard to get products to worth-while markets.

Even building of small houses and improvement, in minor way, of tracts, did not prove a winning investment. Roads especially bad, even in summer. Many hills. Very high altitude. Mountainous region. Long, hard pulls. Notoriously hard on horses.

Germans paid to start small farms.

Given percentage of profits to handle the ground along scientific methods.

Owner of property bought a number of high-power motor trucks and put them on the roads, working from farms to markets, even as far as New York. Momentum given the entire proposition.

Roads began to improve almost from the start. State road, interlocking with a new branch turnpike, was a practical asset. Possible to reach Litchfield in a half hour from the property.

Property began to sell; small boom on. Land very rich and under analysis by Washington experts, showed profitable for certain lines. Planting done in accordance with this report. Plain, unexaggerated case where motor trucks made a great farming land valuable.

The CCJ leads in circulation, advertising and prestige

How Mixing Business with Pleasure Added to Haulage Economy.

Farmer, Hungarian, sold eggs, butter and certain form of cottage cheese in large quantities. Had always used horses for delivery and had a fine stable of seven hardy animals. Was sentimentally attached to them; loved horses. Received second-hand motor truck in land deal as part payment. Took it reluctantly. Son learned to operate. It soon came into immediate favor and record was kept of the very definite saving.

Three other trucks of the same kind added and horses sold, despite the old attachment for them. Area of markets widened. Could climb hills that had proved stumbling block to progress before.

Son devised unique way of making profits still greater. Trucks more than self-sustaining. Turned into dividends. Let it be known in the surrounding country villages that these large trucks could be had Sundays, for picnic purposes.

Each could hold ten persons, with special plank side-seats. Great success of this in summer months. Roads good and even long hauls were not hard on the machines. Fifty cents per head charged or money arrangement covering the trip, in advance. During winter season, when market work lightened, carried children of better class families to school. Stopped, morning and night, for pupils at various homes along a prescribed route. So much per month for this, in all kinds of weather. Trucks were left for other work in middle of the day.

Nursery Rescues Dull Season and Creates New Market.

Slump in sales of flowers, shrubs, ferns, etc., came slowly on large nursery. Inexplicable. Doubtless due to trade conditions, weather, and strong competition nearer at source of demand. Conference held. Dairy on next acreage was in act of moving. Owner going to Florida. Had a battery of ten motor trucks in excellent condition. They could be had at a bargain, almost half their real worth.

They were "bought in" as an investment. Original intention not to use them in the flower business at all. An accident turned the tide of trade and fortune.

Suggestion made by one of the partners that potted plants be sent out broadcast to city market, direct to homes—geraniums, pansies, hyacinths, etc. Boxes and baskets of ferns.

Suggestion not liked, at first, as being rather undignified and perhaps in violation of compact with florists, locally. Objections overcome.

An entirely new market created.

Form letters assisted in cementing happy little service to homes, both in town, apartments, and those with summer homes. Prompt weekly or daily deliveries made of potted and cut flowers.

Their five landscape gardeners would lay out small yards, at nominal charge, and plants were brought in record time from the nurseries. Wagons had always been used, with occasional recourse to freight or express, dependent upon nature of shipments. Field therefore limited in this particular business. Motor trucks "got there and back" in speedy fashion and at nominal cost.

Trucks in the Dairying Section

By FRANK FARRINGTON

IF there is a country district where it has been claimed by the farmers that the truck could not succeed the horse, it is the hilly dairying sections where the milk is produced that supplies the large population centers of the East. Here the roads along the river valleys frequently abound in steep grades which the roads leading back into the hills are long, heavy climbs.

Much of the year there is snow and in Spring and Fall there may be mud to the hubs of a lumber wagon. In many parts of New York State and New England a hundred days of sleighing in a winter is not remarkable.

How, then, can the farmer use a truck advantageously to haul his milk to the creamery and his feed home from the feed store?

It may as well be admitted at the outset that with the mud hub deep or the roads drifted full of snow to the tops of the stone walls, the truck is pretty nearly useless. I say pretty nearly, because it is still valuable as a power adjunct where the motor may be used to run the milking machine, the cream separator or the buzz-saw that cuts up many cords of stove wood through the winter.

But, while we think a good deal, those of us who live in the hill country, about the deep mud of some days and the deep snows of other days, the mud and the snow which stop automobile travel nowadays are the exception, coming infrequently and lasting but a few days.

The farmer must have horses anyway and at the times of the year when there may be some days when the auto truck cannot get through, the horses are getting no farm work whatever and will be the better for being put on the road with the milk and other hauling. On the other hand, at the seasons when the horses are working, the roads are good.

But as a matter of fact, even in the hilliest sections, such as the Western Catskills, for instance, from whence comes so much of New York City's supply of dairy products, automobile travel is not suspended through the winter. The writer in the winter of 1914-15 drove a heavy car all winter over country dirt roads as well as State roads without having to lay it up at all, and that was not an exceptionally open winter.

Motor stages run all winter, both passengers and baggage trucks. Farmers haul milk all winter with trucks. Frozen roads, ice and even snow seem to have no terrors for the motor any longer.

One farmer of my acquaintance runs a three-quarter ton truck regardless of weather and roads and he does not live on a macadam road either. During last winter which was most exceptional for the amount of snowfall, no trips were missed until February and even then the little truck pulled its load of milk cans through snow one and two feet deep for its daily trip of ten miles. Occasionally some shoveling was necessary and there were some days when the drifts were too deep, but as a whole little work had to be done by the horses even under the most adverse conditions imaginable.

Of course, the great disadvantage under which any kind of an automobile labors in the snow when horses are drawing only sleighs, is the fact that the sleigh is much narrower in tread than the auto or wagon. This makes it necessary for the motorist to make at least one track for himself, outside of the sleigh tracks, and if there is little motor travel, it is hard driving to pull along with one wheel out in the unpacked snow. But where even a country road has a few cars going and coming, this outside track is kept open and packed down.

The increased mileage of State road is reducing the disadvantage of the winter use of the truck in the country and the farmers living along the State roads are the best kind of prospects for the purchase of motor trucks. They do not want heavy trucks, not expensive trucks, but trucks the upkeep of which is low and trucks which can be handled in bad roads, preferably trucks which can be dolled up a little for use to go to town, to church or to ordinary business errands where no load is to be taken.

The farmer is beginning to realize that his time is worth something, that his farm runs better when there is more time to give to study and thought about methods, when he himself, the highest priced man on the place, does not have to spend all his time in work that can be done just as well by a hired man costing him thirty dollars a month and board. It does not take very expert salesmanship to show a farmer where he can save enough time by the use of a truck himself to enable him to do his farming on a more scientific basis.

Because a farmer uses feed in large quantities is no reason why he need buy a big truck to haul it. He can draw his feed in small lots on trips to town for other purposes and on trips down and back after supper, or at times when there is nothing else to do, when the actual rest of the little motor trip will do him good, and do his wife good, if he will take her along.

A light truck should mean to an intelligent farmer the difference between living in the backwoods and living practically in the edge of town.

The truck dealer who goes after the farmers in a systematic and businesslike way on this truck proposition will help more than he realizes toward making his town a better place for business, toward lifting up living conditions among folks in the surrounding country. And every truck sold means an increase in the number of possible purchasers for more trucks.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

Ward & Ward Motor Fleet a Success

By GEORGE W. GRUPP

DURING the last year ending April 27th the Ward and Ward, Inc., the largest retail bakers in Buffalo, N. Y., and who operate a fleet of one hundred twenty-one 750 lb. Ward electrics, fifteen Fords, two 2½ ton Wards, one 5 ton Ward and one 2 ton Alco, in and about Buffalo, have demonstrated to the people that motor trucks can be used throughout a winter as well as summer. Take for example during the recent flood in South Buffalo with their light electrics they were the only bakers which were able to deliver goods to their customers. "The only reason we were able to operate our trucks through this sea of water," said Charles W. Giller, secretary of the company, "was because our electrics are equipped with water-tight motors."

This firm has divided the city up into 97 retail routes and 5 wholesale routes. The former ones are a direct from baker to family proposition while the latter ones apply to hotels, agents, etc.

The small Ward electrics are used exclusively in their retail business in Buffalo while on the wholesale routes and the retail trade in the outlying towns.

Their big electrics are used in carting less than carload lots of baked goods to the various express offices from whence they are shipped to over 400 customers. The 2 ton Alco with two four-wheeled trailers leaves Buffalo each morning for Niagara Falls to supply their three Ford trucks which operate in and about Niagara Falls. In such cases where the towns are very close to Buffalo, such as Lancaster, Depew and Tonawanda, then the trucks haul their own loads from the bakery in Buffalo to their customers.

Do Their Own Garaging

One hundred and thirty-one of their motor trucks are housed in their own garage in Buffalo. It is located on the ground floor of the bakery. It is 60 x 224 in one wing and 32 x 75 feet in another. It is equipped with a machine shop, a large power plant, a wood shop, and ten automatic wagon washers, etc. A corps of men are constantly employed in this garage. No truck is permitted to leave it if it is not in good order.

Each truck as it returns in the evening backs up to its assigned place along an "L" shaped loading platform. At its assigned place a connecting plug can be found. This the driver attaches to his battery. Then he goes to the switchboard room and turns on the current. He has little difficulty in finding his particular switch, as they are all numbered. Thus each truck leaves each morning with a fresh charge of 120 volts. The current is supplied by what has been said to be the largest Edison storage plant in the State of New York, as it charges 97 cars at one time. This plant is located in the basement of the bakery.

Trucks Operate on Schedule

In the morning all trucks leave on a regular train schedule. The first leaves at 5.45 A. M., the next at 5.46 and so on each minute until 7.22 A. M. No driver is ever permitted to enter the shipping room. He leaves his orders at the office in the evening and the next morning his goods are delivered to him in large wooden crates which are passed through large opening onto the platform. Each truck has its own opening. In eight minutes the truck is loaded and on its way for the day.

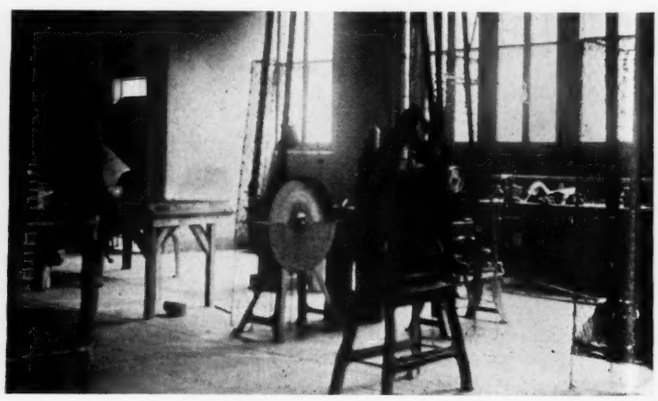
As the driver drives along or through his particular territory it is imperative that he be keen and wide awake. He must watch for the Ward sign which might be hanging on a veranda, window or some obscure place.

Possibly one of the things which makes their salesmen well liked by the busy housewives is their neatness in appearance. Each morning, in the summer, they put on a clean white suit. In the winter, they wear corduroy suits. Each driver works on a salary and commission basis.

"Our plan," said Mr. Giller, "to operate trucks in our 'bakery to family method' has been a wonderful success. It has saved for us an enormous amount of space which would have been necessary if horses were used. It is a big saver of time and expense. With electrics, dirt is reduced to its minimum."

Ford Delivery Used by Ward & Ward

Being loaded at its assigned place at the loading platform. Note the opening onto the platform



Two Interior Views of the Ward & Ward Establishment

On the left is shown one section of the Ward & Ward loading platform. Note the numbers on the platform, also the connecting plugs. The platform is even with the level of the truck body. On the right is a sectional view of the machine shop in the company's garage

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

Are Differentials Necessary in Truck Axles?

By AUTHUR M. LAYCOCK, Chief Engineer Sheldon Axle & Spring Company

THE idea of operating without a differential is not new. It has been successfully used on racing cars for a good many years, but in the commercial field it has not been used to any great extent, particularly in the heavier sizes.

The following advantages of this type of drive must be particularly interesting to truck users:

1st: Positive Pull on Two Wheels.
2nd: Greater Tire Mileage.
3rd: Less Wear and Tear.
4th: Gasoline Economy.
5th: Dependability.
6th: Simplicity.
7th: Weight.
8th: Price.

Positive Pull on Two Wheels

The positive pull on two wheels can only be appreciated by the truck user himself. Nothing is more exasperating than getting in a mud hole with one wheel only and having that wheel spin while the other is on perfectly good ground. In order to get traction, chains are run around the tires, which in a good many instances only digs the hole deeper until finally jacks and planking have to be used in order to get the truck out. If there is a positive drive on both wheels, the one wheel on good ground will invariably pull the truck through a very bad place. This construction also prevents absolutely any spinning of the wheels when starting under load.

It is a well known fact in Europe at the present time that the conventional differential on the Army Service Corps trucks will be a thing of the past. Some form of positive drive or locked differential will be called for on the various subsidy specifications.

We prophesy that a little cross-country work in Mexico with the United States Army Service Corps will bring about the same thing.

One has only to imagine a truck operating under shell fire and extremely muddy roads and the truck becoming mired when questions of greater mileage, less wear and tear, gasoline economy, etc., are of infinitesimal value as compared to the truck getting out and from under fire. But even when greater tire mileage, less wear and tear and gasoline economy are the questions, one really cannot see any serious objection to cutting out the differential.

The conditions with the average business man are just as important and vital and almost analogous to trucks operating under war conditions.

Greater Tire Mileage

Quite a few of our best racing cars have been equipped with a solid rear axle, the claim being made that the action of the spinning of the wheel when in the air is very much more detrimental to the tires than the little slippage on rounding a corner on the race-track. Similar conditions exist when running a solid tire in heavy truck service over rough cobblestones. Any close observer driving behind a truck under these conditions will invariably be able to see under the tires without any difficulty whatever. At the moment these wheels are in the air they must of necessity accelerate and come down on the road at a different speed from which they left, grinding off the rubber to a much greater extent that when rounding corners with a blank differential where the slippage is uniformly distributed throughout the entire periphery of the tire.

In truck service, with the limited experience we have had with the blank differential as compared to any other, it is noticeable that the temperature rise in the tires is very much less when rounding corners under severe loadings with the solid axle than the spinning action of the wheel in a mud hole with the regular differential.

The tire wear, of course, is largely a question of heat units. It is quite a common sight to see a heavy truck in difficulties with the tires smoking from the spinning action of the wheel on soft ground.

Mr. Green, of the Fifth Avenue Coach Co., has been working jointly with the Sheldon Axle Co. for a considerable time with the idea in view of dispensing with the differential. Up to the time of writing, these 'buses have not made sufficient average mileage to warrant our forming any definite opinion, but one bus has to its credit over 15,000 miles on one set of rears, while the average tire mileage is considerably below this.

Charles P. Ward, of the Ward Electric Vehicle Co., has also been experimenting along the same lines, and has found in taking a city block—eight blocks to the mile, continuously under load, the difference in the battery consumption cannot be noted when using the differential or without. The tire wear of course is in direct proportion to the amount of energy consumed in spinning the wheels under adverse conditions and this can be very accurately calibrated on an electric vehicle.

Less Wear and Tear

There is certainly less wear and tear with the blank differential on engine and all running gear when one wheel partially leaves the ground, due to the irregularities of the road as aforementioned.

This variance is felt throughout the whole chassis, from the engine clear back to the rear axle, and in a good many instances sets up a frightful vibration, and makes it most disagreeable to negotiate coblestone roads, particularly when light in the rear. The results obtained from the blank differential as compared to the regular one in this respect are most pronounced. Riding on a truck with a solid differential the load is rarely taken off both wheels at once. When one wheel leaves the ground, the full torque is absorbed in the other wheel remaining on the ground, holding the engine down and preventing racing to a very, very marked extent.

The regular differential reminds one of a steamer. Every time the propeller lifts out of the water the engine races and sets up such a vibration that in a good many instances you wonder whether the ship is going to hold together or not. Imagine what a call there would be by marine constructors for something which would absolutely prevent the propeller shaft racing. This is certainly analogous to the truck situation at the present time with the exception that the motor truck can now prevent racing, with its attendant wear and tear on all the parts affected by eliminating the differential.

Gasoline Economy

Every time the propeller leaves the water on a steamer and beats the air, it is just like throwing so much coal overboard. The wheel need not leave the ground actually, but the pressure be relieved to such an extent due to the oscillation of the spring over irregular road surfaces that the wheel begins to spin and the tractive effort instead of being used for the propulsion of the truck, is simply using the gasoline to no purpose. This is quite pronounced on heavy vehicles where the wide track is used. One wheel is tracking on good ground all the time, while the other is slipping in soft mud. There is not a single truck designer of repute who has not been in serious difficulties at some time or other under these conditions. The writer is well aware that the tractive resistance might be double, due to the condition of the road surfaces, but on top of this, the loss due to the spinning differential is certainly quite pronounced.

Under the above conditions, it is common for engineers to consider the radiator too small—the engine not large enough—or the gear reduction wrong, when in a good many instances the differential is directly responsible, operating on extremely muddy roads with a very heavy gasoline consumption at the best and sooner or later a solid axle will be called for more extensively on account of gasoline economy, if nothing else.

Doubles Stresses in Driving Shafts

With the elimination of the differential, one has to be extremely careful with the size of drive shafts, as this doubles the stress in these members and must be amply taken care of. The particular advantage of using the Sheldon semi-floating axles under these extreme conditions lies in the fact that the outer ends must of necessity be made very liberal in size due to the combined bending and torsion, and it is a

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comparatively easy matter to increase the inner ends of the drive shafts. If this is done, there is absolutely no question of broken drive shafts and the whole axle is thoroughly dependable.

Simplicity

Cutting out the differential ring gear and pinions with the spiders has reduced this design to its simplest possible form. Every one of these parts are going to wear with attendant backlash.

The elimination of backlash alone is almost sufficient justification for the design, but the simplicity of the construction will appeal to every one.

Weight

One of the objections at the present time to the live axle type of drive is the unsprung weight at the center of the housing. This, of course, is in the worst possible place and the more the center can be lightened the sections throughout the axle can be considerably reduced.

There is also a distinct gain in the oil capacity as compared to the full type of differential. The outside dimension of the axle housing remains the same. The space taken in the ordinary construction with gears will allow of that much more oil being carried, which is a consideration when operating under severe conditions.

Price

It is evident at a glance to the layman that there is considerable reduction in price to be made in this construction in connection with any form of drive known at the present time, and we prophesy that this alone will give it the increased popularity it richly deserves.

Summarizing, after considering all the various points, it is well not to become too enthusiastic, as the introduction of a blank differential on the face of it is so drastic that one must of necessity move with extreme caution. The time taken in rounding a corner is only a fraction of 1 per cent. of the straightway running, and if a truck is continuously operating around a city block (eight blocks to the mile), it figures around 4 to 5 per cent. of the straightway time, but with average wheelbase and track, and good strong drive shafts, the positive pull on two wheels, greater tire mileage, less wear and tear, gasoline economy, and the extreme dependability with simplicity, weight and price in its favor, we prophesy quite a following of the blank differential.

SUCCESSFUL USE OF DISTILLATE IN SEATTLE

By WARREN EUGENE CRANE

"With the remarkable rise in the price of gasoline, distillate will soon be the fuel for truck owners of the West," said Henry E. Schmidt, Manager of the Northwest branch of the Kelly-Springfield Truck Co., in Seattle, Wash. "It is being used satisfactorily in four of our trucks and we expect that within the course of a year it will be employed in a majority of the motor trucks in Seattle. It is saving half of our fuel cost and that is a big item in the maintenance of commercial vehicles."

The use of distillates began a few months ago in three Kelly-Springfield trucks operated by the Linnton Auto Bus Co., in Oregon. Three of their big trucks, with a capacity of twenty people, are using distillate at a saving of 60 per cent. on fuel. Where they formerly paid $200 a month they are now expending $90 a month for the same purpose. They are using a straight distillate with a fire test of 54° and are getting the same results as they did with gasoline. They have a stove manufactured in Los Angeles which is connected with the exhaust running around the intake manifold that heats the distillate and breaks it up before going into the engine. There are ten metal discs around the stove which distribute the heat. They prime the engine with a half a pint of gasoline each morning from a glass Lunkenheimer oil cup which is placed on the dash. After doing this they say that the truck can stand six hours during the day, and yet start immediately on distillate. One of their cars using low grade fuel has run 50,000 miles while the other has run 35,000 miles in the half-hourly and hourly motor bus service which they furnish between Portland and Linnton, a distance of 14 miles.

The Kelly-Springfield Truck Co. has been testing out one of its commercial cars in Seattle with distillate and has found it very successful. On the machine here they have been using a hot-air intake and have been putting a teaspoon of rich mixture in each cylinder and priming every hour and a half. The St. Marie Fuel Co. has just purchased the truck upon which they made the test and they will use it for hauling coal

S. F. Moseley, Manager of the Northwest Motor Co., used car department, stated that he has an Oakland Forty car in which he is using distillate with good results and that it climbs the steep hills in Seattle without trouble.

The Queen City Transit Co. is using third grade fuel in its Buick motor omnibuses operating from the Seattle postoffice to Cowen Park, a distance of 4 miles. These cars have a capacity of twenty passengers and make twenty round trips daily. M. D. Carzes, Manager of the company, asserts that for a little over a month they have used distillate and found that it develops just as much power as gasoline. He says that he uses the Stromberg carburetor and has wound a copper coil around the exhaust. This heats the distillate so that it is warm when it goes to the carburetor.

A new company, known as the Birrell Silent Motor Co., has just been organized with a capitalization of $50,000, to manufacture an engine in Seattle for the use of distillate. The office is at 21 Haller Bldg., and the factory at 408 Occidental Ave. This engine can be used in automobiles, aeroplanes and submarines and can develop 95 h.p. It is silent because of the novel form of valves and valve mechanism; vibration is reduced to a minimum because it has only one reciprocating part to each cylinder, as compared with three on other engines.

From a careful survey of the experiences of automobile men in Seattle and the Northwest, the following conclusions have been made. First, distillate saves half or more on fuel cost. Second, it produces a combustion as good as first grade gasoline, when either a hot-air intake is used or a stove is put around the exhaust. Third, the older type of engine using it will require priming with gasoline. Fourth, it will be ultimately in general use in commercial cars throughout the United States.

Brockway Motor Truck Co., Cortland, N. Y., has received a repeat order for twenty 2-ton worm drive trucks from the Adams Express Co. for service in New York City.

Fairchild, Gilmore & Wilton, who do a great deal of street contracting work around Los Angeles, have decided to replace their entire horse-drawn equipment with commercial cars. It has been using 5 Moreland trucks, a 3-ton and 2 5-ton machines. When ordering more trucks the company stated that the trucks have effected a saving of more than 20 per cent., counting operating costs, depreciation, etc.

Kelly-Springfield Truck Using Distillate

These trucks are in use in California and cover about 150 miles per day, between Portland and Linnton, making six round trips. A teaspoonful of gasoline in each cylinder is used in the morning for priming. The trucks are very successful and are saving about half on fuel cost

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Will Distillate Help?—The California Low-Grade Fuel

Present Tendency in California to Substitute Eight and a Half Cent Distillate for Eighteen Cent Gasoline. Difficulties Which Must be Overcome. Is it Entirely a Question of Carburetion?

By FRANK REED

THE climate of Southern California is responsible, among many other things, for having removed the arrangement for heating gasoline, presumably installed to assist starting on the cold mornings which prevail in that land which to the Californian mind is one of perpetual snow, from trucks shipped out of the East.

Now Western truck owners by the score are looking at the mounting quotations of gasoline and saying, "What is the matter with trying distillate?" "Distillate" is the trade name of the next lower grade fuel, the "second cut" in the distillation of the asphalt base crude which is the product of California wells, where gasoline is the "first cut." So the little stoves are going back on, and after the stoves are on they monkey with the various proportions of heating and carburetion, and change carburetors, and keep salesmen busy. It is a lively man's job to find out what is going on in this line in Southern California just now, and to deduce a tendency from all the conflict of theory, guess, fact, argument and assertion. After making a very careful and dispassionate and rather comprehensive and penetrating inquiry covering most of the trade and many private owners, it is felt that there will be no contradiction of the following division of the field into classes of claimants in regard to the distillate situation. First, straight positive and negative:

1. Distillate, when properly handled, can be used satisfactorily as a fuel in motor trucks.

2. Based on a long time experience and careful study the disadvantages of using distillate more than offset the difference in cost over the price of gasoline.

The camp of those who are favorable to the use of distillate is again divided into classes of opinion as follows:

1. The successful use of distillate is purely a matter of carburetion. The matter of heating is a minor matter which can readily be taken care of by a "stove" of the ordinary type for heating the air from the exhaust manifold before it enters the carburetor.

2. The question of heating is the all-important one and with proper heating any good carburetor that breaks up the fuel well will work.

In addition to the pure distillate "fans" and the gasoline "bugs," there are the half and halfers, who are monkeying with a mixture of gasoline and distillate in varying proportions of each. They are fighting the law of gravity which tends to separate the liquids of two varying densities, although the agitation of the tank when the truck is in motion will slop them together in a certain admixture.

Objections Offered to the Use of Distillate

The following is a statement of the various objections which have been heard as to the use of distillate. They are presented without prejudice and without any intention of passing upon their validity, or of presenting the special conditions which caused them and do not apply universally, or the arguments or facts which are opposed to them, in conjunction with the objections.

1. Distillate makes hard starting of the engine.

2. If the carburetion is not perfect it gives an unpleasant odor and does not give as much power as gasoline.

3. With incorrect heating or carburetion or both the engine does not run as clean as with gasoline, valves are dirtier, etc.

4. With imperfect combustion of the distillate the liquid runs into the cylinders, thins the oil, destroys the lubrication, leads to carbon deposit and scoring of pistons and cylinder walls. When this progresses to a point necessitating reboring from that date on any repair work becomes a special job, requiring special rings, etc., increasing time the truck is held up for repairs and cost of doing the work.

5. Distillate tends to heat the engine quicker and is harder on bearings and piston pins.

6. Under imperfect combustion distillate wears out spark plugs and gums them up more rapidly than gasoline.

7. If a man is not making a success of burning distillate it takes him a year or so to find it out in the effects upon his machine, which are those of progressive deterioration, so it is costly stuff to experiment with.

Is the Saving From Burning Distillate Worth While?

This question seems to depend for a satisfactory answer upon the validity of the objections to the use of distillate. That is, if the saving is clear, gained without any deterioration of the truck, there can be no question that it is worth while. On the other hand, if there is a risk to the machine the situation is as has been stated to the writer by certain dealers. One says he "does not hear much complaint about the present price of gasoline. Those who have work for their trucks and are making money keep still. The real remedy for the others is to get out and hustle for business. If cost of fuel is worrying a man, he has a business that is not on a paying basis."

Another dealer puts it this way: "The daily consumption of fuel for a truck, averaging in those of one to three tons capacity, is five to six gallons a day. The present increase in price means a new added cost of less than one dollar burning gasoline. The average driver has a chance by the exercise of mechanical ability to save lots of gasoline. For example, he could treat his valves at the very beginning of valve trouble, and thus avoid general overhauling and the expense or loss of income of laying his truck up for weeks when the trouble reaches an aggravated stage. Gasoline in California has been $.11, but the producers were undoubtedly losing money at this rate. Many people think the price should hold at $.15 as a figure that would let the producer out with a reasonable profit. With gasoline now at $.18, the margin of probable excess cost should not be figured as the advance over $.11, but as the difference between $.15 and $.18, and the maximum differential between gasoline and distillate should be that between $.18 and $.085, the present price of distillate. The only way to judge whether distillate is a profitable fuel is on the basis of continuous running for a considerable period of time, certainly not less than one or two years."

Analysis of the troubles experienced with distillate seems to give them all a common foundation—incomplete combustion—and this in turn gets back to the question of vaporization involved in carburetor action and heating. Even those who claim that distillate heats the engine more than gasoline can trace their objection to the matter of lubrication, which in turn depends on combustion. Even with imperfect lubrication they point out that the driver can watch his machine carefully and shift into a lower gear when the engine gets hot. Some trucks of practically every make are now burning distillate in service in Los Angeles and vicinity. Most of these are equipped with either Ensign or Master carburetors, with a little "stove" or "heater" on the exhaust pipe for heating the air.

The experience is that these trucks burn the same number of gallons of distillate as of gasoline and save the difference in cost. They have adopted the plan of letting the truck run on gasoline at night long enough to fill the carburetor and gas line, then start the engine on gasoline and run it until it warms up in the morning, then switch to distillate.

Distillate Question One of Price Against False Pride

One trade authority says that the price differential is so strong that it is bound to force a very large proportion of commercial car users, whether of the truck or pleasure car type, to burning distillate. The only thing that is preventing this or delaying it is that men are not willing to put their pride in their pocket to save money. The man who wants to make the saving represented by burning distillate must be willing to stand for a few laughs from other motorists if he is caught cranking up on the

street. He must be willing to take the trouble involved in using gasoline to run it at night, and for his morning start to warm up the engine, and then to shut it off and switch on the distillate. The point is made by some that the economical use of distillate is impossible in a truck which is so employed that it has frequent long waiting sufficient to allow the engine to cool off, as this intensifies the starting handicap by multiplying the nuisance it occasions in the course of each day.

The Moreland: A Distinctive Distillate Truck

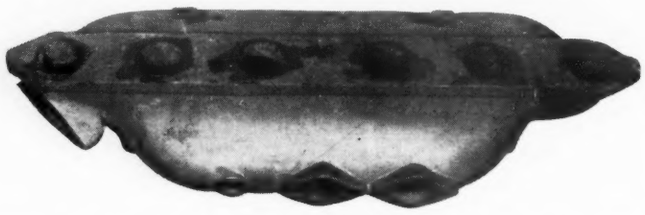
That the problem of using distillate has actually had a satisfactory solution and has a sound economic principle behind it is indicated by the service which is being delivered under a great variety of conditions by the Moreland truck, made in Los Angeles, which was specifically designed to burn distillate, and whose manufacturers have from the beginning used its ability to do so as a selling argument. It was back in 1910 when distillate was used practically exclusively as a cleaning solution or in heavy duty engines and was almost a drug in the market, that Watt Moreland, of Los Angeles, conceived the idea of using it as a fuel in motor trucks. The application of heat was obviously the proper treatment to experiment with in connection with working out the combustion of distillate, and Moreland invented what he called the "Moreland gasifier," by means of which the engine is adapted to the use of distillate as a fuel. In this truck the carburetion is virtually the same as for gasoline, the difference being that the liquid fuel is brought in contact with hot air to assist in vaporizing it as is common practice in modern gas engines. The most important function of the gasifier, however, is that which is performed between the carburetor and the engine. On account of the lower gravity of distillate and the lowering of the temperature caused by the vaporization of the liquid, there is a tendency for the vapor produced in the carburetor by the admixture with pre-heated air to go back in part to a liquid between the carburetor and the intake valve in the cylinder of the engine. By keeping the vapor hot in this interval the Moreland gasifier delivers it into the cylinder as a hot, dry gas. It is important to note that the name "gasifier" denotes the function of keeping the vapor in the form of a gas, and that the word is related in no way to the word gasoline. The Moreland people claim that any use of distillate which does not involve the proper application of heat in this interval causes the engine to suck more or less liquid fuel into the cylinder, and this liquid fuel has a tendency to run down past the piston and cause the troubles which are commonly attributed to distillate.

The Moreland truck is equipped with a two-compartment tank, holding, for example, 18½ gallons of distillate and 1½ gallons of gasoline, the feed line being controlled by a three-way cock operated by a handle located at the side of the chassis beneath the tank. The operator is expected to run on gasoline the last thing at night, and in the morning to run five minutes on gasoline to heat the engine and gasifier and then turn on his distillate. If he should stop long enough to cool the engine and gasifier, he should repeat this operation. However, it takes over one hour to cool off the gasifier, which is made of cast-iron to retain the heat a long time, and there is something wrong with the schedule of a truck which makes many stops of this length of time during a day. The carburetor equipment of Moreland trucks is of the multiple jet type.

Many might be inclined to assume that the reputed mild climate of California is a factor in its efficient operation with distillate. Such a conclusion would not argue a complete familiarity with California climate, which on almost any day of the year varies from arctic to sub-tropical, between the heights of the Sierras and the depths of Death Valley. In the mountains above San Francisco, Morelands are continuously operating through many months of the year in snowy, cold conditions, so that combustion of distillate seems to be susceptible of control on any climate.

As far as the action in the engine is concerned, once the proper mixture is obtained the Moreland people claim there is no difference between gasoline and distillate. The only problem involved in the use of distillate as a fuel is to vaporize it and keep it vaporized, that is, in the form of a dry gas, until it ignites.

Whether the rest of the country has anything to hope for from the existence of Western distillate is a much disputed question. Investigation of present conditions shows that inquiries from the East for both gasoline and distillate are being turned aside by California producers, who insist that the state of the oil market in California is decidedly one of shortage. There has been tremendous growth of the automobile industry in California and its future possibilities are being rapidly developed by an enormous good roads building program. The oil men profess to be worrying about the local situation, and not thinking of profitable exporting. If the Middle West oil men start making distillate, they can produced from a given quantity of crude, late varies considerably in the amount produced from a given quantity of crude, and in quality—in the latter respect, it is said, however, no more than gasoline.



The Moreland Gasifier

The object of this device, which is made of cast iron, is to keep the distillate gas hot and dry. The exhaust is used to keep the gasifier hot.

STANDARDIZATION OF AUTOMOBILE TIRE FABRIC TESTING

The Bureau of Standards, Department of Commerce, has completed a study of the various methods of testing automobile tire fabric as employed by the cotton mills and the tire mills and the results of the several investigations have just been issued in Technologic Paper No. 68.

This work was undertaken with the view to standardize the more important methods of tests made upon 17¼ oz. cotton tire fabric. There was found little or no uniformity in the methods of testing employed by the various mills and this had given rise to the confusion in the interpretation of results of tests. To improve this condition, the Bureau assisted the fabric and tire makers to develop methods of test best suited for these fabrics.

The chief causes of variation in test results were found to be due to different testing machines, size of test specimen, moisture in fabric at time of test, method of selecting samples and differences in the fabric. Comparative tests were made to determine which of the several common methods for ascertaining each particular physical property of the fabric would give the most reliable results.

Interested persons may obtain copies of the publication, which is entitled "Standardization of Automobile Tire Fabric Testing," without charge upon request to the Bureau of Standards, Washington, D. C.

GOVERNMENT STUDIES GASOLINE EXPLOSIONS FROM STATIC CHARGES

The Bureau of Standards is engaged in testing the conditions present when an explosion occurs due to static electricity being induced while filtering gasoline through chamois, and when this work is completed the results will be published in a technologic paper.

Charges may be produced by the friction of clothing against the cushions of automobile seats, by gloves against other material, etc., and the recommendations made by the Government for preventing explosions are as follows: "The danger due to the production of charges in both of these ways may be avoided by touching the funnel against the metal tank at some distance away from the opening before inserting the funnel into the tank, and then inserting it into the opening in the tank in such a way that it remains in metallic contact with the tank while the filtering is in progress. These two precautions prevent the accumulation of charges of opposite sign on the funnel and the tank respectively and thus eliminate the possibility of the passage of an electric spark between the two."

Beech Creek Truck & Auto Co., Beech Creek, Pa., at a recent meeting re-elected its officers as follows: George F. Hess, president; William H. Ward, vice-president; Dr. P. McDowell Tibbins, second vice-president; David M. Packer, secretary, and Israel J. Rohrbaugh, treasurer. Paul J. Smith was made consulting engineer, and Henry H. Salisbury, acting business manager.

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Kerosene, the Motor Truck Fuel of the Future

By RAY HARROUN

MOTOR driven transportation is fast approaching the stage where manufacturers and owners alike will soon find themselves confronted with a new economic condition. This condition arises from the steadily increasing price of gasoline, now virtually the universal fuel for internal combustion engines in America.

When the price of gasoline reaches the point where its use is no longer feasible on the present prodigal scale, public and manufacturers will at last be ready to willingly shoulder the relatively small amount of inconvenience required by engines that burn kerosene, and the change will be made with surprisingly little trouble.

Kerosene is Practical

As an engine fuel kerosene is now perfectly practical. This fact has been proven conclusively and repeatedly. The proof has been given by the use of kerosene in engines designed for gasoline—a highly unfavorable condition. In engines designed for the use of kerosene, the practical nature of the cheaper fuel will be even more pronounced.

Whether or not the economic condition to which I refer has really been reached remains to be seen; but its arrival is, I believe, only a matter of a short time, if the price of gasoline continues its present rapid upward trend. People have declined to accept kerosene-burning motor cars until the price of gasoline will compel them. With gasoline at $.12 or $.15 a gallon the kerosene era would have remained indefinitely postponed. With the standard fuel at two or three times this figure, it is certainly much nearer.

I concur with the view of those who believe that the era of kerosene will begin with the motor truck. It is in commercial transportation that the users count systematically their dollars and cents—their mile-ton costs. As these costs mount, he is becoming more thoughtful—more prepared for a change which may even imply an adaptation of equipment and a more intelligent type of operation. The high speed of truck engines and the fact that they are often driven for long distances without stops, strongly favors kerosene as a motor truck fuel. Still another advantage is the greater number of power-generating heat units in kerosene as compared with gasoline.

In America most of our experiments with kerosene have been made using engines of passenger-carrying cars. Virtually all of this experimentation will be of direct and practical value in speeding the kerosene area in motor trucks. Abroad, where gasoline has long been more costly than in the United States, trucks have led in the use of fuels other than gasoline. There are many types of trucks now in use in Europe which rely either solely or in part on alcohol, benzol or kerosene. They are, however, equipped with engines designed for the heavier and less volatile fuels.

Handicaps in Using Kerosene

In considering kerosene as an engine fuel it is wise to bear in mind from the start the handicaps which now prevail in its use.

Despite the fact that kerosene is admittedly a residual product, it is not easy to get. How many fuel supply stations handle kerosene in quantities? In a campaign of experimentation that has taken me in a kerosene-burning car across the continent, I have found but one. Of course this drawback is only temporary and will be removed as soon as the definite demand for kerosene springs into being. At present, however, the wayside grocery is the one reliable source of fuel supply to the man who is burning kerosene.

Kerosene has earned the reputation of being a malodorous fuel. To a great extent this reputation is unjust. A well adjusted kerosene carburetor gives off no more odor than is the case when gasoline is used as a fuel. A kerosene lamp smokes when not properly ventilated and trimmed; so will a kerosene engine.

Another source of odor is careless tank replenishment. If the kerosene is poured only into the tank, its installation causes no inconvenience. When spilled on the car it is less volatile than gasoline and becomes a nuisance.

Kerosene implies a slight complication in the use of gasoline as a starting fuel, and in the need for warming the kerosene before introducing it into the combustion chamber. While engines can be made to start on kerosene, the process is not an efficient one. A small auxiliary tank of gasoline and a two-way valve, operated by the driver's toe, form the ideal combination. Before an engine stops the gasoline supply should be kicked on long enough to prime the engine, and to charge the carburetor for the next start. When manipulated in this way, starting is as easy as when gasoline is used as the sole tuel.

The warming of the kerosene can be made an automatic process, best performed by surrounding the Venturi passage of the carburetor with a jacket through which the exhaust gases pass. A spiral hot wall which imparts a whirling motion to the gases is a refinement which has proven especially efficient in vaporizing the kerosene, as the swirling movement throws to the hot outer wall the heavier parts of the mixture, which is thus rendered uniform, and does not unnecessarily heat the more volatile fractions of the fuel.

The use of kerosene in an engine with relatively high compression is not advisable, due to the greater expansive force of the cheaper fuel. In most engines this can be remedied by lowering the compression. This fault would be attended to in the design of any commercial car, built for the use of kerosene.

The most serious difficulty with kerosene when used in the conventional engine is undoubtedly its tendency to what I may term "quick ignition."

On account of its greater production of heat, the combustion chamber of a kerosene burning engine should be designed and built for ideal cooling. The water jackets must be virtually continuous. There must be no thick spots in the cylinder wall, for these will not sufficiently radiate the heat of kerosene vapor explosions, even though they may be reasonably satisfactory when gasoline is the fuel used. Piston clearance should be about double that of a conventional gasoline engine, and the pistons should be cooled by fins inside the heads.

It is hard to get good results from kerosene when used in a T-head engine. Even an L-head engine implies difficulties which emphasize the need of simple, scientific design.

When hot spots develop in an engine the tendency is to so heat the charge that, when the spark ignites it, the kerosene explodes with a spontaneity that causes the engine to knock and makes impossible the attainment of maximum horsepower. It is also possible for these hot spots to ignite the charge before the compression stroke is really finished, though this is not a difficulty with which one is often confronted.

I have listed these difficulties in order to point out how really minor they are and how easily they may be surmounted. Against them one only needs to set forward the fact that the engine will do as much work on a $.10 gal. of kerosene as it will on the same amount of gasoline at $.30.

There is ample evidence that, shouldering all these difficulties and without calling to our aid anything in the way of special engine design, kerosene will do the work.

Kerosene Experiments

Since 1913 I have given considerable attention to the adaptation of kerosene to internal combustion engines. During this period I have used kerosene as a fuel in touring cars of five makes, in trucks, and in racing cars. No theoretical calculations can compare in value with practical work of this kind as a proof of kerosene's ability to do the work.

I first worked in private, developing a carburetor which would thoroughly "crack" the kerosene. A considerable road experience followed in which a stock Overland touring car with L-head engine was used for the installation of our kerosene-adapting equipment. This series of tests came to a climax at the Indianapolis motor speedway, April 21, 1913, in a series of officially observed tests on four fuels—common or grocery-store kerosene, Perfection kerosene, motor spirit and gasoline of the ordinary commercial grade.

The tests were so arranged as to be absolutely fair to all fuels. In each case the

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distance was the same and the conditions were uniform. A speed of 25 m.p.h. was maintained.

Following are the results:

Economy Test

Fuel Used	Gravity (Beaume)	Miles per Gal.	Price per Gal.
Kerosene	43	22.2	$.08
Kerosene	49	21.6	.10
Motor Spirit..	62	20.4	.13
Gasoline	60	20	.16

Fuel Used	Ton-Miles per Gal.	Cost per Ton-Mile.	Cost per Mile.
Kerosene	26.64	$.0029	$.0036
Kerosene	25.92	.0038	.0046
Motor Spirit..	24.48	.0054	.0063
Gasoline	24	.0067	.008

These tests proved conclusively that, aside from the advantage of cheapness, kerosene actually developed better mileage than any of the other fuels, and the cheapest grade was the most efficient.

Since the test, gasoline prices have materially advanced. The relative showings of kerosene, on the present prices of fuel, are therefore even more striking than at the time of the test.

The economy test was followed by tests for speed and acceleration. The speed test was a radical victory for kerosene, as the car attained 49.2 m.p.h. over a measured mile, when burning the cheapest grade of fuel. Motor spirit yielded 46.5; gasoline 43.2. In acceleration kerosene was a close third, the car increasing in speed from 10 to 30 m.p.h. in 16.4 seconds. With spirit the increase took 16.1; with gasoline, 16 seconds flat.

Prior to these tests the writer and the official observer, Darwin S. Hatch, made an overland run in the same car from Chicago to Indianapolis, using kerosene as fuel. Over the 224.2 miles, which included a good deal of bad road, we averaged 17.25 miles to the gallon of fuel and the car showed normal power at all times. In neither Chicago nor Indianapolis did any casual observers, including traffic policemen, manifest the least knowledge of any unusual condition.

In all these tests the car's cooling system was thoroughly adequate. We added but 2 qts. of water to the original supply in making the trip from Chicago to Indianapolis.

So strikingly successful were these tests that the Henderson Motor Car Co., of Indianapolis, installed our carburetor on the Henderson car as optional stock equipment for 1913. A considerable number of these cars were sold. So far as I know there has been no fault found with the way the kerosene installation worked out. The cars met with an especially enthusiastic reception in the Rocky Mountain region, where, at that time, gasoline stations were far apart but kerosene was available at any country store.

One of these cars was entered in the Indiana-Pacific tour of 1913 and made the entire run with kerosene as a fuel, using gasoline only for starting. The report of this run showed a distance covered of 4,015 miles on an average consumption of 15.6 miles per gal.—an unusually economical figure for trans-continental touring. The car carried four or more passengers and their luggage, securing its supply of fuel from roadside sources only, and completing the trip on a fuel expense of $31.76.

This car ran more than 18,000 miles on kerosene without changing a spark plug or requiring any engine attention whatever.

The carburetor of this car required no adjustment aside from that accomplished from the dash.

At the time of the Indianapolis Speedway experiment there was a flurry in gasoline prices and great interest had been shown in engine economy problems. A few months later the Standard Oil Co. developed new refining processes which resulted in a marked reduction in gasoline prices all over the country. Interest in kerosene as a fuel dropped rapidly. With gasoline at almost the same price as kerosene there was no incentive to use the latter.

From a scientific standpoint more than any other I continued my experiments by installing kerosene equipment on two of a fleet of three racing cars I built in the spring of 1914 for the Maxwell Motor Co. These two cars were driven by the late Billy Carlson, Jr., and by Hughie Hughes. Carlson covered a practice lap at Indianapolis, electrically timed, in 1.36—the fastest on record at that time. In the 500-mile race he won ninth prize in spite of a number of handicaps not in any way the fault of the kerosene he used as fuel. His economy record of 14.5 miles to the gallon is, I believe, unique in Speedway racing for cars of 450 cu. in. displacement.

Later in the year Hughes won the Tacoma Potlatch trophy in a kerosene-burning Maxwell, averaging 76 m.p.h. for the 200 miles of the race.

Only a few months ago two young adventurers returned to the United States after a trip around the world which they made in a Henderson car burning kerosene as the sole engine fuel. Such a trip would have been impossible on gasoline, unless fuel had been shipped ahead and distributed along the line. The tourists using kerosene could secure supply from wayside stations, even in China and Siberia.

I have mentioned these instances of successful use of kerosene as a fuel because it is possible in this way alone to convince the student of economics that there is no necromancy connected with successful operation of an internal combustion engine on kerosene.

It might be worth while to mention here that the successful kerosene equipped engine can be operated on any other available fuels, such as benzol, naphtha, distillate, alcohol or gasoline, and any trade wars for supremacy affecting the internal combustion engine's fuel supply will have no effect on limiting the uses of gas engine-propelled vehicles.

Contrary to the general belief, the kerosene-equipped engine will idle just as slowly and operate with exactly the same flexibility as will the conventional gasoline equipment.

Even in engines designed to use gasoline, kerosene can be made to operate with reasonable success by the addition of a relatively small amount of special equipment. Except in engines insufficiently cooled, kerosene will yield greater mileage and greater or equal power. It will leave less carbon deposit and will foul fewer spark plugs. But for the fact that, in extreme conditions implying hard pulling on high gear at slow speeds, a disagreeable knock is in evidence, the kerosene-equipped car of present conventional type would be thoroughly satisfactory. The remedy for this condition, as I have pointed out, is one which must find its source on the engineer's drafting board.

Surely, if so much can be done with engines, only adapted to gasoline, much more will be accomplished when engines are designed especially for this cheap, efficient fuel.

It is reasonable to predict that trucks will point the way in leading motordom to the kerosene era—this despite the fact that in engine development, trucks have heretofore always trailed in the wake of passenger car design.

Kerosene development in the commercial world must start with a genuine demand from truck users. This demand must spring from an argument based on the cost of ton-mile transportation. When the demand comes, truck designers must throw to the winds the engines they now use, and design carefully to kerosene-burning details. These details must include water jacketing, piston-cooling provisions and, most important of all, the proper ratio of connecting-rod length to stroke and bore, this being shorter for kerosene than for gasoline. Also the ratio of internal exposed combustion chamber surface to the displacement should be kept as low as possible, as in the valve in the head type. The result will prove profitable to manufacturer and owner alike. More than any other factor now in sight will it increase the scope of engine-driven commercial cars.

A kerosene-burning era for motor trucks would enable producers and refiners of oil to greatly conserve the efficiency of their product. It would reduce the cost of gasoline without increasing that of kerosene. At present every effort is being made to secure the greatest possible percentage of gasoline from every gallon of crude. The demand and price have justified the employment of expensive methods. A great amount of kerosene fractions remain in the commercial grades of gasoline now on sale. With an equal demand for both products, refining cost of gasoline could be greatly reduced and the forcing processes discarded.

Present conditions in the fuel market may not always maintain but gasoline will always be more costly than its companion product. The user of the kerosene-burning truck will always be better off than the man who clings to the more costly type of fuel, regardless of the degree of variation in the price of the two commodities.

Garford Motor Truck Co., Lima, Ohio, at a recent meeting of stockholders elected the following: E. A. Williams, president and general manager; J. M. Garver, vice-president; J. Imler, secretary, and I. A. Stull, treasurer.

The CCJ has most readers because it gives most information

Sulzberger & Sons Adopt a Bonus System

By WALTER A. BERMINGHAM

THE Engineering and Operating Department of Sulzberger & Sons Co., U. S. A., began the partial motorization of their delivery equipment, for urban and other than railway transfer. in 1906. During the past three years they have made an intense and exhaustive study of the relation of the various sizes of horse-drawn equipment. different capacities of motor vehicles and the field in which each unit is the most efficient.

Sulzberger & Sons Co. adopted the use of the motor by giving part of their salesmen a Ford runabout, also assuming the expense for the up-keep of them, an expense which soon assumed figures of unlooked-for magnitude. That plan, after a few years, was abandoned. Salesmen desiring a Ford runabout may now obtain them through the company and by a small monthly payment become the sole owner of this car in two years. An allowance of a certain sum each month for up-keep is made.

Thirteen Autocars Used by Sulzberger & Sons, in Chicago

At the present time this company's commercial car fleets are distributed as follows:

Chicago—13 2-ton Autocars, 2 Ford delivery cars, 4 salesmen's runabouts.

New York—15 General Vehicle electrics, 16 gas cars.

Mineola, L. I.—1 2-ton Autocar.

Los Angeles—18 cars, including 2 2-ton Autocars.

Plans are being formulated to motorize the Pittsburgh and Cleveland branches.

The motor truck drivers are paid for their services as follows:

Three tons and over (inclusive) at rate of $.32½ per hour; over one ton and under three tons, $.28 per hour; and one ton and under, $.25 per hour.

At the present time the gasoline question enters very much into the economical operation of motor trucks.

The Sulzberger System is said to obtain twice the mileage from a superior grade than from the ordinary, and has figures to support this claim. It makes weekly gasoline tests, seeking why, when cost increases in operation of its service. Filling the tank to capacity, a reading of the transimeter is taken, then the quantity of gasoline in the tank at the end of six days is closely checked, another reading taken, then knowing the numbers of gals. and the mileage, the actual gasoline consumption is determined.

"It purchases gasoline according to distillation tests, paying no attention whatever to gravity, and uses a gasoline which is completely distilled off at about 360 degrees Fahrenheit."

The Sulzberger Chicago motor fleet operate, exclusively, daily, on well defined routes delivering products to regular customers. A dispatcher with a recording route sheet on his table, one similar to that in use by a railroad dispatcher, can, by 'phone, within a few moments, locate any unit of the fleet.

The operating cost, per cwt., (delivery) of the fleet is high because the Sulzberger policy is satisfied customers, one necessitating prompt response to emergency calls, emanating, at times, from a route or neighborhood which either had or would be taken care of, daily, by a truck leaving the packing plant delivery platform with a capacity load and covering the same route. The special motor truck delivery, while satisfying the customer, means a small package may have been the load—a motor truck expense peculiar to the Sulzberger policy. A motor truck run for a pound or a ton is peculiar to the packing industry and hardly applies to any other industry.

Every unit of the fleet is inspected once every two weeks, nuts tightened, etc. Drivers are forbidden to make repairs.

The Sulzberger system to reward careful drivers of their fleet is as follows:

NOTICE TO CHAUFFEURS

It is our desire to bring about a condition, whereby good efficiency will be obtained from our Gasoline Motor Trucks, and it is also our desire, that the drivers of these trucks be rewarded for co-operating with us in promoting this condition.

We have formulated the following plan:

BONUSES

The tires on our Autocars are guaranteed for 7000 miles. We propose to give each chauffeur 33 1-3 per cent. of the saving he makes on tires, which run over this guarantee. If a tire, or full set of tires, run 6000 miles over guarantee, and estimating that four tires cost $140, this would be two cents a mile on the 7000 mile guarantee.

On one tire it will be pro rated on the above basis. One third (1-3) of the amount saved will go to the driver.

$15 and $10 to be given to the drivers who have the lowest and next to the lowest, respectively, repairs on their machines at the expiration of 5000 mile run, mileage, tonnage, condition of engine, in regard to efficiency, cleanliness and so forth to be considered.

Any driver being absent from duty for more than one week, when truck is in service, will at the option of this Department, forfeit all rights to participate in any of the bonuses, sickness excepted.

When drivers resign by request or otherwise, all accumulated bonuses on that truck are forfeited to this department.

Later a bonus of $3 per month will be given to the driver having the lowest consumption of gasoline per mile, all things such as tonnage, mileage, condition of machine considered.

The above applies to the 13 Autocars that are now in Chicago Plant, and will apply to any conditional Motor Trucks we buy and designate from time to time.

The drivers are to make absolutely no adjustment on carbureters, magnetos, and so forth. We have expert repair men for this kind of work.

TRUCK STARTERS SHOW POOR ECONOMY

The General Motors Truck Co., of Pontiac, Mich., recently made a series of tests to determine whether or not the average starter is more economical than allowing the truck to stand with the engine turning over slowly. The test was made by allowing four G. M. C. trucks to stand with the engines running slowly and the gasoline consumption and time were accurately measured. The ¾-ton truck ran for 5 hours on 1 gallon of gasoline, the 1½-ton for 4½ hours, the 2-ton for 3½ hours, and the 3½-ton for 3 hours. The annual operating cost of a starter, assuming that the cost of installation would be $150, was figured by the G. M. C. engineers as follows:

Depreciation at 20 per cent.	$30
Interest at 6 per cent.	9
Maintenance (battery, etc.)	3
Repairs (labor)	4
	$46

This estimate figures a daily operating cost of 15.3 cents, allowing for 300 working days in the year, while no account is taken of the possibility of accidents and the resultant expenses and loss of time. The conclusion reached is that from a purely economical standpoint the starter is not desirable as truck equipment.

The CCJ has most advertisers because it gives them biggest returns

"Service," the Corner Stone of Baker's Business

By H. G. BLODGETT

CALL up Mr. Phelan and tell him that he has simply got to have those new tires put on tomorrow. We'll let him use one of our cars while his is in the shop. His front tires are all worn out. Impress upon him the fact that it is the most expensive kind of economy to let his truck bump along over cobble stones on the rims."

It was the jovial Allen Baker speaking to his office man. He had just noticed the Phelan truck grinding along the asphalt on its rims. The next day the car was jacked up in the process of being newly "shod," and the Phelan trucking went right on in the service car supplied free by the dealer.

That's service with a capital "S." It's exactly the kind of service that has doubled the sales of the Federal Truck Co., of St. Louis, of which Mr. Baker is the president, each year for five years. Yes, there's always a mechanic and a service car on tap at Mr. Baker's service station. No matter what happens, day or night, the customer's hauling goes on without interruption. And Baker doesn't wait for "something to go wrong." That's not his idea of "complete service" to truck buyers. As was the case with Mr. Phelan he went out of his way to see that that "something" never happened.

Exclusively a Truck Dealer

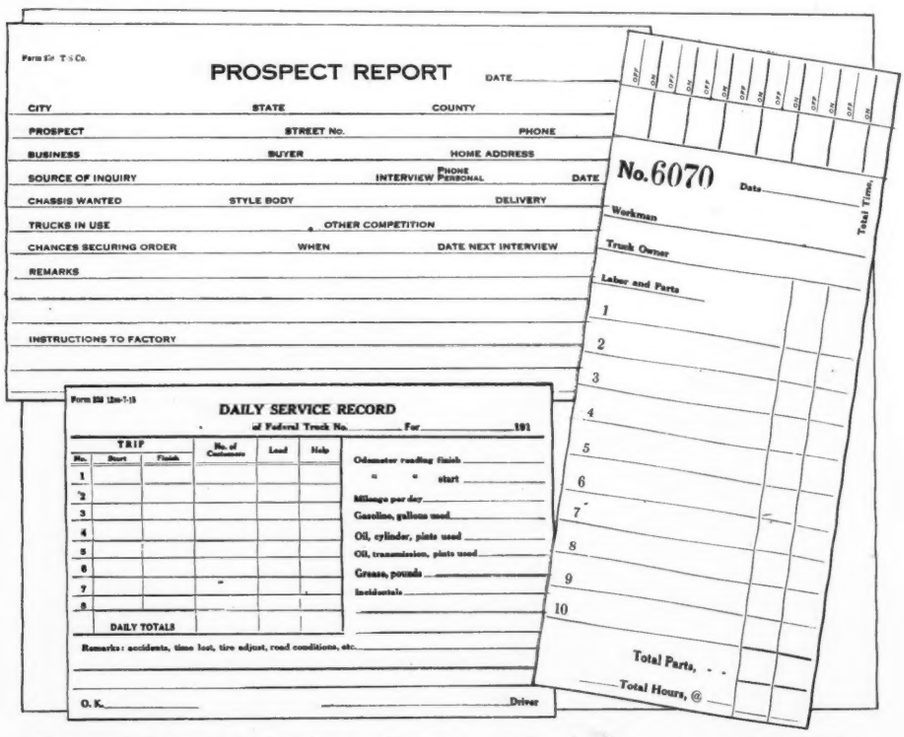
It was five years ago that Mr. Baker first realized the great possibilities that were opening in St. Louis for an exclusive dealer in commercial cars. Believing that the greatest future lay before the medium priced, medium weight car, a car that would fulfill the requirements of the average truck prospect, he took on the Federal and obtained exclusive rights in territory within close to 100 miles of St. Louis. To fill the bill with the buyer who sought a lighter and less expensive car he added the "Commerce" to his line. For a heavier car than the Federal people built at first he took on the Standard, but this truck has since been supplanted in Mr. Baker's salesroom by the heavier Federal now being built.

His first cars were delivered to him on a sight draft basis. Result, he sold only for cash. And thanks to his strict adherence to the "cash" principle in those early days he still pays cash for his cars and gets cash for them. The fact that he had to pay cash helped him to stick to his policy of selling for cash, and he is glad of it.

Knowledge of the fact that Mr. Baker's business had outgrown its present large quarters caused the writer to seek the reason for this man's selling success. How did he get a line on prospects? What system does he employ in following them up? What argument does he use to land the same buyer? Has he any special plans for helping the prospect solve hauling the sale when competitors hammer away on problems of adapting the truck to his special requirements?

"Service" is Mr. Baker's answer to all queries as to "how he does it."

He gets his list of prospects through every available source. He has a "Prospect Card" for filing data about each, and to help in the follow up work. He advertises modestly and he links up with



PROSPECT REPORT

DATE

CITY STATE COUNTY

PROSPECT STREET No. PHONE

BUSINESS BUYER HOME ADDRESS

SOURCE OF INQUIRY INTERVIEW PHONE PERSONAL DATE

CHASSIS WANTED STYLE BODY DELIVERY

TRUCKS IN USE OTHER COMPETITION

CHANCES SECURING ORDER WHEN DATE NEXT INTERVIEW

REMARKS

INSTRUCTIONS TO FACTORY

DAILY SERVICE RECORD

of Federal Truck No. For 191

TRIP No.	Start	Finish	No. of Customers	Load	Help
1					
2					
3					
4					
5					
6					
7					
8					
DAILY TOTALS					

Odometer reading finish start

Mileage per day

Gasoline, gallons used

Oil, cylinder, pints used

Oil, transmission, pints used

Grease, pounds

Incidentals

Remarks: accidents, time lost, tire adjust, road conditions, etc.

O. K. Driver

No. 6070 Date Total Time

Workman

Truck Owner

Labor and Parts

1 2 3 4 5 6 7 8 9 10

Total Parts,

Total Hours, @

Prospect Report, Daily Service Record and Service Department Job Ticket

Mr. Baker supplies owners with "Daily Service Record" cards and then each week or month helps them figure up results and costs; the "Service Department Job Ticket" is stamped by automatic time clock. It is seldom that a service job is completed at one sitting, hence this record of every minute spent on a car, every part supplied, and every workman employed. This record of parts supplied must tally with requisition blank, giving a double check on that bane of the Service Department, the unexplainable "shrinkage" of the supply of parts.

Name	Hours	Time
Monday		In / Out / In / Out / In / Out
Tuesday		In / Out / In / Out / In / Out
Wednesday		In / Out / In / Out / In / Out
Thursday		In / Out / In / Out / In / Out
Friday		In / Out / In / Out / In / Out
Saturday		In / Out / In / Out / In / Out
Sunday		In / Out / In / Out / In / Out

Week Ending

Hour Rate Amt. Total Hours

Received above amount in full of all demand to end of period named on this card. Paid by check No.

Signed

Weekly Time Card for Employees in Service Department

Totals for each day as shown on the job tickets must agree with this report

The CCJ leads in circulation, advertising and prestige

the excellent advertising campaign of his principals. He is well primed with mechanical arguments when it comes to a keenly competitive sale, but his competitors are likewise armed to the teeth. He studies the prospect's hauling and helps adjust the truck to his special needs, but any radical adjustment is seldom necessary.

Other Truck Owners Send Buyers

"No," said Mr. Baker, "I have no mysterious or highly developed line of sales effort, all bound 'round with a mile of red tape. The biggest part of the prospects who finally buy from me come first because some truck owner who has bought from me sends them. I do not credit myself with the salesmanship that sells to these or to prospects whom I line up through other channels. I give to every prospect a list of every commercial car owner in St. Louis who has bought from me, with the 'phone number of each. He can go around and see them all, or call them up—not a few of my personal friends, but all of them. The prospect generally avails himself of this frank offer. He hears, not from me, but from my old customers, of wonderful mileage records, hauling and delivery economies, low up-keep, and the day and night service by my organization that keeps trucks going day and night, winter and summer, through mud and sleet and sand. Yes, my Service Department is my best salesman. It's always on the job. It keeps my cars sold by keeping them running most economically. And the best of it is that this Service Department pays its own way.

"Don't think for a minute," continued Mr. Baker, "that the average commercial car owner expects a lot of service for nothing. If he hires a green man to drive his truck he is glad to pay the cost of straightening things out. When he buys he figures on paying a certain amount for up-keep. He is willing to pay for repair parts and labor. But his hauling must be done in the meantime without a hitch, and so we lend him one of our service cars and drivers (to fulfill insurance requirements) and charge him exactly what his own expense records show that it costs him to run his own car. All records of time and parts used in this service work are carefully kept in double-checked form so that honest bills, which can be easily OK'd, are inevitable.

"But there's seldom chance for complaint on that score. There goes a truck now. I sold it to the fire department more than two years ago for supply work. The total repairs in twenty-seven months amount to $.60."

Fayette County, Ky., is using a motor truck for road work.

General Motor Truck Kansas City Branch has been purchased by Estel Scott, formerly manager. It will be continued hereafter under the name of the General Motors Truck Co., of Kansas City.

Quigley Furnace & Foundry Co., Springfield, Mass., has changed its name to the Metal Production Equipment Co. No change has been made in the general policy or management. The furnace, foundry and powdered coal departments will be continued as heretofore and a brass rolling mill department for the production of flat brass has been added.

American Motor Trucks in Mexican Army Service

THE Yaqui Indians of Mexico are being subdued by the Constitutionalist Government with the aid of American-built motor trucks. Baldamero A. Almada, purchasing agent of the Mexican Constitutionalist Government, has informed the Moreland Motor Truck Co., of Los Angeles, Cal., that since their purchase, seven of the ten 2½-ton Moreland distillate trucks recently purchased through him for the Constitutional Government of Mexico and assigned to the army of the Northwest, were operating against the Yaqui Indians in the State of Sonora. Senor Almada advised that these trucks were daily carrying their capacities in arms, ammunitions and general supplies from Ortiz and Corral on the railroad to the soldiers in the field. He further stated that "the road conditions in this section are very trying, sand, desert and steep mountain grades are encountered, but these are negotiated without trouble by the trucks, and their cargoes delivered with a promptness and despatch that has been a revelation. It has been necessary at times to send trucks with soldiers after raiding bands of Indians and these expeditions have been satisfactory. There are two trucks with General Flores' Army at Mazatlan, State of Sinaloa, and one with the Division at Hermosillo, State of Sonora, where the officers likewise have nothing but praise for the American trucks."

The representative of *Commercial Car Journal* has obtained further details of interest concerning the service rendered by these trucks from an American mechanic who has just returned from the scene of their activities. Four of the trucks which he observed working out from Ortiz were making a 30-mile haul, twenty-five miles of which was in sand and mountain grades where a truck had never been seen before. On the first haul the drivers simply went out over the desert where there was not even a track. The sand there is like that of the desert of the Southwest United States, dry and looks hard, but gives way and lets the truck sink almost to the hubs. The first trip took three days to get in, now the trucks make the thirty-mile trip one way every day. When the train comes in to Ortiz the trucks load up and haul the supplies from the railroad to the main camp of the army, transporting food, ammunition and men. They make trips close to schedule except when interrupted by snipers. Each truck carries twelve armed guards besides the driver and a 2-ton load. The grades on this haul are from 10 to 25 per cent. and are continuous upgrade for twelve miles away from the railroad. The truck makes this usually on the second and third speeds, some places gets into high and a few it covers in low. These trucks are burning even worse than distillate, a product known as "tops," which is between 40 and 45 deg. gravity and resembles vinegar in color. The temperature in early spring was 90 to 100 deg.

The two trucks operating out of Mazatlan through the country shown in the photograph are the first ever unloaded there. They are working between the railroad station and six cuartels for soldiers in the town, a distance of about four miles over a terrible road said to be the worst in Mexico, paved many years ago with boulders. There are never four wheels on a level as these trucks cover the distance. The privates in the Mexican army states that the trucks save work for them to a great degree as compared with packing on horses and mules. Ten trucks are supplying an army of some 20,000 men who have drawn a thirty-mile diameter circle around 8,000 to 10,000 Yaquis.

Moreland Trucks in Service of Mexican Constitutionalist Government, at Mazatlan, in Mountainous Country Through Which They Operate

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

MOTOR TRUCK SAVES MONEY FOR COUNTRY CLUB

In the southwestern corner of Cook County, about forty minutes' ride from Chicago, is located the Midlothian Country Club. This club has a very large membership and for the convenience of its many members, most of whom are Chicago residents, the club has built a standard gauge railroad between the club house and the Midlothian station on the Rock Island Railway, a distance of about 2¼ miles. Over this track an electric passenger car is in constant service, carrying the members to and from trains. Electric power for operating the car is supplied by a nearby public service corporation. The cost for electric power in making the round trip of 4½ miles with the electric car amounts, approximately, to $3.50, and this cost is, of course, the same whether there are one or fifty members to be brought from the station. On Saturdays and holidays, when there is a capacity load for the electric car, the operating cost is reasonable. However, during week-days there are frequently only six to a dozen passengers to and from one train. This made the operation of the electric car rather expensive.

In order to give the same service to the members, and at the same time reduce considerably the operating cost, the board of directors of the club has purchased an International one-ton gasoline truck, which is to replace the electric car on days when traffic is light, and help out on Saturdays and holidays when traffic is heavy. This truck is a standard stock chassis. The only changes necessary were to provide flanged wheels to replace the regular solid rubber tired wheels, and a stiff front axle to replace the regular front axle with the steering knuckles. The steering gear has also been removed, leaving only the steering post with its spark and throttle control.

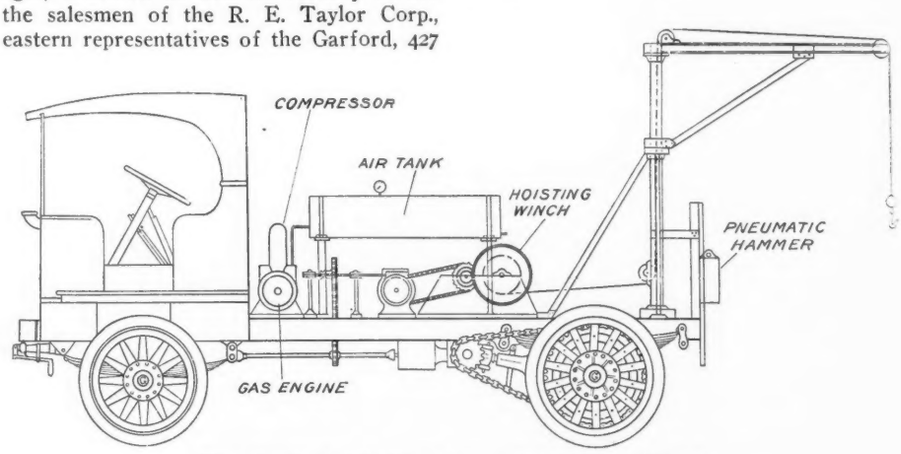
As the electric car could be operated either way, loops or turntables were not necessary. A device of this sort was necessary with the gasoline truck, as it would be unpractical to operate it in reverse one-half the time. This problem was solved by a club member who designed an inexpensive and rather ingenious turntable. One of these turntables was placed on a siding at each end of the line, and now the driver can turn the truck around in a moment's time.

To make the round trip of 4½ miles with the gasoline truck costs less than 10 cents for gasoline and oil. When several trips are made each day, the enormous saving that is made for the club by the installation of this light gasoline truck is readily appreciated.

A GARFORD MOTOR TRUCK FOR THE CIRCUS MAN

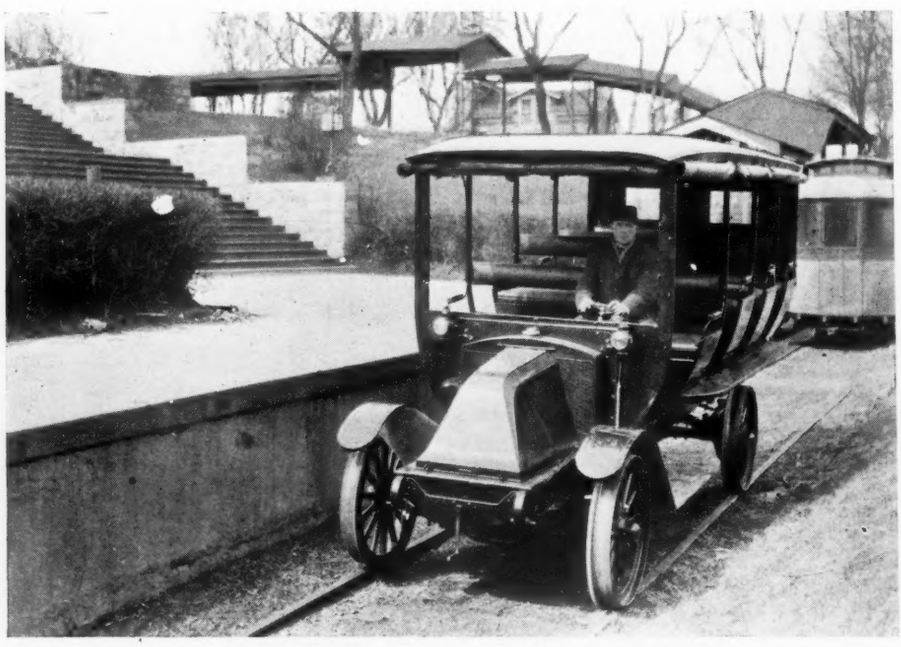
Louis E. Cooke, well-known circus manager, delivered an address recently before the salesmen of the R. E. Taylor Corp., eastern representatives of the Garford, 427 West 42nd Street, New York City, at which time his idea of a specially designed circus motor truck was unfolded. W. W. Mitchell, of the Newark Garford Service Branch, made the drawing depicting Mr. Cooke's ideas, and which drawing is herewith reproduced.

Circus work is hard work. There is an infinitude of heavy lifting and hauling under the worst sort of conditions. Great, often wet, canvas must be rolled and lifted and put on wagons; stakes must be driven and pulled; reluctant animals must be put into cages—a thousand-and-one things must be done on the circus "lot" that require power. This power heretofore has been that of men or animals. But with this new "Circus Utility Wagon" all that is now over. Note the crane extending from the rear, capable of being swung in any direction to pick up heavy objects like wet canvas and load it on a waiting truck. See the pneumatic hammer that can drive a stake ten times faster than the hardiest "roor-back" circus man can do it! The crane can also pull the stake up when desired.



The Garford "Utility Wagon," for Circus Work

There is a small gas engine to work an air compressor and fill the tank shown with compressed air, for use in vibrating the hammer and operating the crane—all controlled by the driver on his seat. A separate engine like this is an economy and, furthermore, allows the use of the truck's own engine to move the truck back and forth to desired positions. This machine can easily do the work of scores of men and do it faster and better every way.



International Harvester Truck Displaces Electric Trolley

Makes four and a half mile trip to club house at less than ten cents for gasoline and oil, while cost with electric trolley is figured at $3.50

Ward Motor Vehicle Co., Mt. Vernon, N. Y., owing to the steadily increasing cost of material and labor, has been forced to increase the price of its vehicle.

Studebaker Corp. has compiled figures disproving the theory that the market for commercial cars is restricted largely to big cities. Henry T. Myers, sales manager of the commercial division, states that commercial car sales in towns from 5,000 to 50,000 inhabitants are considerably greater in proportion to the population than in the large cities. Of the 10,000 half-ton and 1-ton trucks to be produced by the company during the 1916 season, a large proportion have been contracted for by the distributors in towns of a size not considered seriously as a market for commercial cars two years ago.

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

Two New Signal Models, One and a Half and Five Ton

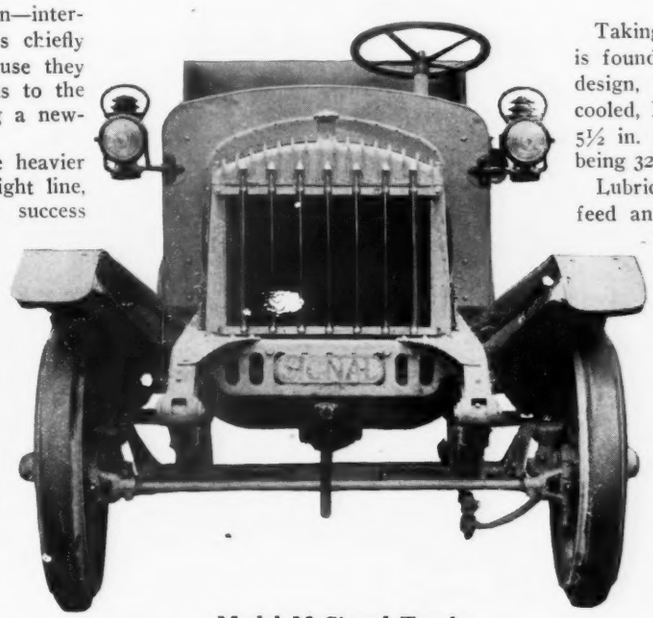
By LEN G. SHAW

WHILE the Signal Motor Truck Co., of Detroit, Mich., makes no less than five different sizes of trucks—to be specific, 1-ton, 1½-ton, 2-ton, 3½ and 5-ton—interest at this time centers chiefly in the latter two, because they are comparatively recent additions to the line, the 5-ton in particular being a newcomer.

The determination to enter the heavier field, as well as continuing the light line, was prompted chiefly by the success achieved by the smaller models. The lessons learned in this connection have been applied to the more recent accessions in a manner that promises to produce equally pronounced success.

Stability has been the evident desideratum in the new Signals. They are of conventional type, but the standard units incorporated have been utilized in such a manner and the construction simplified in such a way that maximum service seems assured with a minimum outlay for maintenance and repair.

To show how thoroughly the principle of service has been worked out it can be related that the designers have incorporated a Continental engine of special type, Brown-Lipe transmission, Timken worm and gear wheel, David-Brown rear axle, Timken front axle, Detroit springs, Brown-Lipe multiple disc, dry plate clutch, and other parts whose worth is recognized among truck makers and users. This simplifies manufacturing to a pronounced degree.



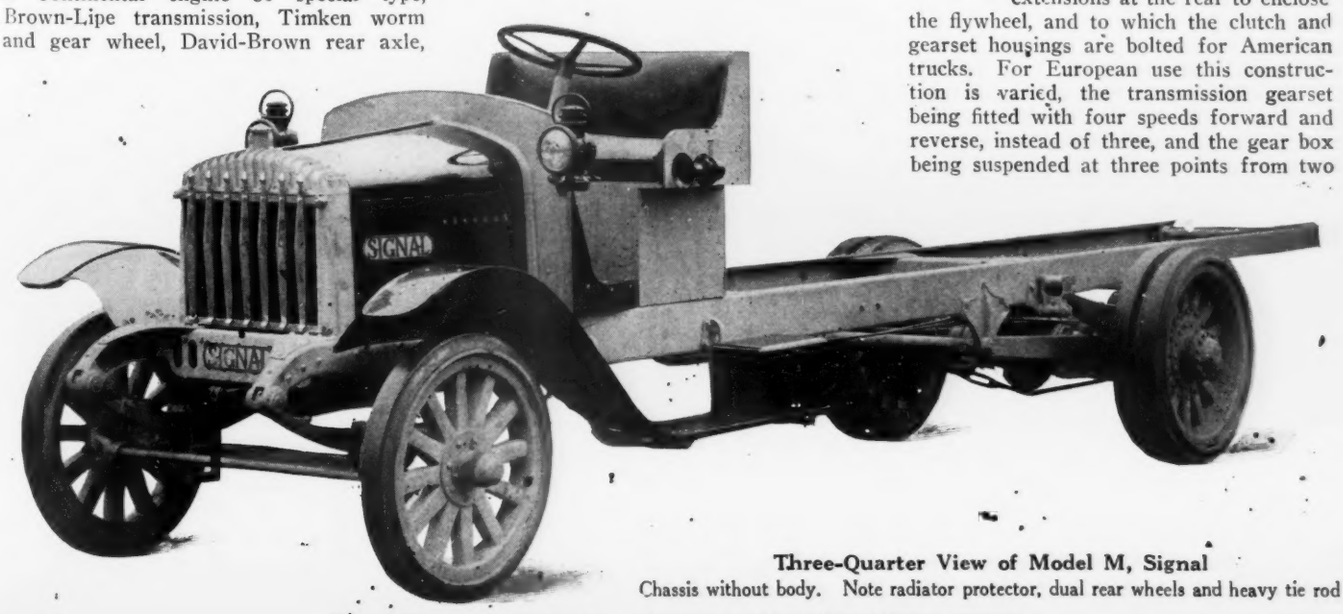
Model M Signal Truck
Front view of three and a half ton unit, showing sturdy axles, springs and radiator

The Power Plant

Taking up the 3½-ton Signal in detail, it is found that the engine, of special truck design, is four-cylinder, vertical, water-cooled, L-head type, with 4½ in. bore and 5½ in. stroke, the S.A.E. rating accorded being 32.2 h.p.

Lubrication is by a combination force feed and splash system that is very efficient, the oil being drawn from a reservoir by two plunger pumps, actuated by eccentrics on the camshaft and forced through a tube to the rear main bearing and the timing gearset. The excess of oil drains back to troughs in the bottom of the crankcase, where splash lubrication by the big ends of the connecting-rod takes care of the cylinders, pistons, wrist pins, cams, tappets and the center main bearing. Oil pockets cast in the walls of the crankcase provide lubrication for the camshaft bearings.

The nickel aluminum alloy crankcase is cast in two sections, both having bell housing extensions at the rear to enclose the flywheel, and to which the clutch and gearset housings are bolted for American trucks. For European use this construction is varied, the transmission gearset being fitted with four speeds forward and reverse, instead of three, and the gear box being suspended at three points from two



Three-Quarter View of Model M, Signal
Chassis without body. Note radiator protector, dual rear wheels and heavy tie rod

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cross-frame members, with a longer clutch shaft and shorter main shaft. The drive and control is then right side.

Cooling is through a gear driven centrifugal pump that has extra size bearings and a tubular radiator of large capacity. This radiator is of a distinctive type, being built up, with cast top and bottom tanks and cast water columns and a tubular central core, protected by a series of vertical bars bolted to the top and bottom tanks. A large fan, mounted on an adjustable ball bearing in a bracket on the forward end of the cylinder casting, is driven by a flat belt from a pulley on the water pump shaft.

The carburetor is an automatic float feed type with a hot air duct to assist carburetion. A Bosch NU4 type magneto provides ignition, with a fixed spark. The engine is adjusted to a definite speed by a suction type governor that is adjustable and is secured by a padlock.

Suspension of the power plant is three-point—spherical bearings on the ends of arms cast integral with the flywheel housing, and at the front by a trunnion in a steel bar that is mounted on helical springs.

Clutch and Gear Set

The Brown-Lipe multiple disc dry plate clutch has 14 surfaces covered with asbestos fabric, the friction surfaces being 8 in. outer and 6 in. inner diameter. All of the tempered saw steel clutch plates slide on hardened and ground keys riveted to the outer and inner clutch drums, the thrust being cared for by a bearing that absorbs both radial and thrust loads. Annular bearings mounted in the flywheel support the end of the clutch shaft.

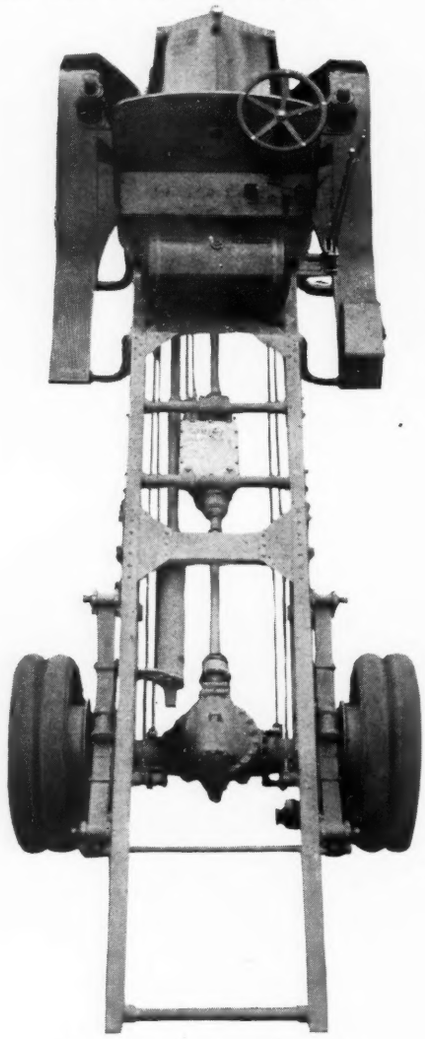
The transmission is Brown-Lipe selective sliding gear, with three speeds forward and reverse except, as noted, in trucks for European use, where four speeds are incorporated. The gears and shafts are nickel steel, of generous proportions, and the shafts are carried in Timken bearings. The gearset case also carries the control levers and pedals. Power is transmitted to the rear axle by a 2¼ in. tubular shaft, with three heavy Spicer universal joints enclosed in metal cases. The forward section of the shaft is mounted at the rear in a self-aligning ball-bearing that finds support on the frame cross-member.

The Timken worm and gear wheel David-Brown rear axle is full floating, with a cast steel housing in three sections and a truss of substantial proportions. The construction of the rear axle is interesting, the worm shaft and gear wheel and the differential being mounted on the heavy cover plate of the central section. By removing the cover retaining bolts the assembly can be lifted out intact, an ingenious arrangement in the way of accessibility. The spindles are 3½ in. in diameter, with Timken roller bearings throughout.

The front axle is I-beam, 3⅛ and 2¼ in. in size, with spindles 2⅛ and 1½ in. in diameter, and fitted with Timken roller bearings in the steering pivots and on the axle spindles.

The frame is of pressed steel, ¼ in. stock, 8 in. channel, with 3½ in. webs. Three heavy cross-members gusseted at top and bottom give great rigidity.

The frame is carried at the front on semi-elliptic Detroit self-lubricating springs 3 x 45 in. The rear, also semi-elliptic, are 3½ x 56 in. All spring eyes are fitted with phosphor bronze bushings, and there are oil cups on all shackle bolts. The front spring shackle bolts are 1¼ in. in diameter, and the rear 1½ in., they being shackled at both ends to very heavy hangers.



Plan View of Signal Chassis
Signal three and a half ton truck. Right-side drive is used for export

Sturdy radius rods rotating on annular seats on the axle housing and pivoted to very large hangers on the frame so that they may have a vertical movement with the axle take all the traction and braking stress. They are adjustable for length.

The steering gear is Ross worm and gear truck type, with ball thrust bearings and 20 in. hand wheel, the column being located at the left, with center gear changing and emergency brake levers. The clutch and service brake are actuated by separate pedals. Brakes are adequate for any emergency. They operate in 19 in. drums on the rear wheels, the shoes being integral expanding, 3½ in. in width, and each giving approximately 418 in. of braking service.

A foot accelerator governs the fuel supply, a welded steel gasoline tank of 30 gal. capacity being located under the driver's seat.

Wheels are wood, artillery type, with twelve 2½ in. spokes in the front set, and fourteen 3 in. spokes in the rear. The 36 x 5 in. solid band tires forward and 36 x 5 in. solid band dual rear tires are demountable.

Optional wheelbases are 14 and 17 ft., and the tread is 65 in. forward and 68 in. in the rear. The frame for the 14 ft. wheelbase chassis is 126, 144 and 168 in., and the 17 ft. chassis is obtainable with 180, 198 or 216 in. loading space behind the seat as desired.

Standard equipment includes driver's seat, front fenders, steps, tool box, oil side and tail lamps, horn, jack and kit of tools. The price, in priming coat, is $3,000 f.o.b. Detroit.

The Five-Ton Signal

In a general way the 5-ton Signal truck follows closely the lines of the 3½-ton model, save, of course, that there is a corresponding increase in keeping with the added carrying capacity.

The side members of the frame are 10 in. deep, the length of frame behind the seat for the short chassis being 12 ft., 13 ft. 6 in. or 15 ft., as specified, and for the long chassis 16, 18 or 20 ft. The width of the frame is 38 in. The front tread is 66 in., the rear 72 in., and the clear space between the wheels 58 in. Model R has 15 ft. wheelbase. Model RL 18 ft. Tires are solid, 36 x 6 in. single in front, 40 x 6 in. dual in rear.

Four speeds forward and one reverse are provided with this model. Ignition is through Eisemann high tension magneto, with fixed spark, the speed being limited to 15 m.p.h.

The weight of the chassis only is 3500 lbs. With standard equipment and in priming coat it sells for $4,000 f.o.b. Detroit.

BELMONT ELECTRIC DELIVERY CAR—$985

Belmont Electric Auto Co., Wyandotte, Mich., has secured the Murphy Machine Shop, in which will be built the Belmont electric motor car. It is expected that the first car will be turned out early this Spring. The prices will be decidedly popular—the delivery car selling at $985; the 4-passenger at $1400 and the 6-passenger at $1600. It is claimed for the Belmont that it will make 75 miles on a single charge of the battery. A charging plant will also be provided for $150, which will make the Belmont owner entirely independent of charging stations, etc. The company has temporary offices at 410 Scherer Bldg., Detroit, and J. H. Bishop is president. The personnel will be announced at an early date.

Hyatt Year Book of 1916 *Tractors* is the title of complete directory of farm tractors which has recently been issued by the Tractor Bearings Department of the Hyatt Roller Bearing Co., at Chicago, Ill. The tractors are clearly illustrated and the specifications of each conveniently listed.

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Diamond T Model L, Three and a Half Ton Truck

A NEW size has been added to the line of trucks made by the Diamond T Motor Car Co., Chicago, Ill. This is to be known as the Model L of 3½ tons capacity and the price is $3300 f.o.b. Chicago.

Engine, Clutch and Transmission

The engine is a Continental of unit power plant type, four cylinders, 40 h.p., 4½ in. bore and 5½ in. stroke. Cylinders are cast in pairs.

The clutch is a Brown-Lipe of multiple disc type, friction surfaces being Raybestos against steel plates. This clutch runs dry, there being no oil necessary.

The transmission is also a Brown-Lipe, and is of selective sliding type, allowing three speeds forward and reverse. This is of extra heavy type for motor truck duty.

Axles

The front axle is a drop forging of I-beam section Timken make, and positive locking device for attachment of bearings. Rear axle is also made by the Timken-Detroit Axle Co., and is of worm drive, full floating type. Gear ratio is 8¾:1.

The propeller shaft is equipped with two universal joints of Spicer make and a heavy steel bearing carrier with Timken bearings on the middle cross member of the frame. Two universal joints are between bearing carrier and rear axle. The use of two shafts avoids the whipping action which would occur if one extremely long shaft were used. The joints are of ample size and have grease tight steel cases.

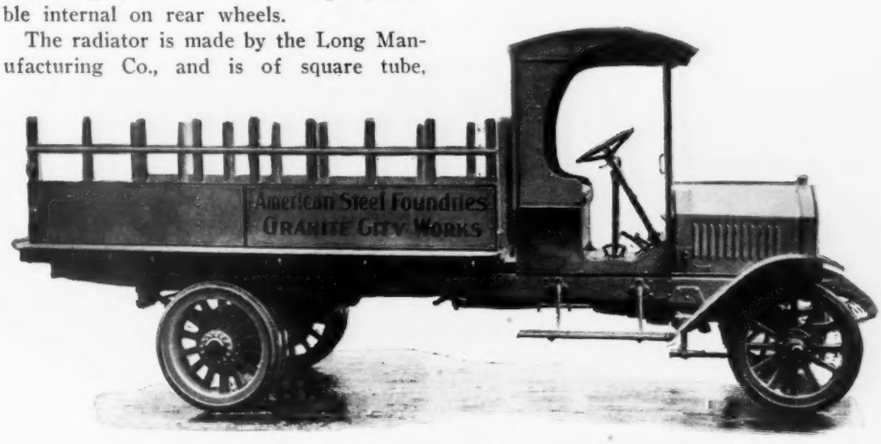
Running Gear

Springs are made by the Mather Spring Co. and are of chrome vanadium steel, the front set being semi-elliptic, as is also the rear. All spring pins are of special steel, hardened and are provided with grease cups for lubricating. The spring eyes are bronze bushed.

Schwarz wheels are used, S.A.E. standard size, there being twelve 2¼ in. spokes in front and fourteen 3 in. spokes in rear. The wheels are fitted with 36 x 5 in. single tires in front and 38 x 5 in. dual tires in rear.

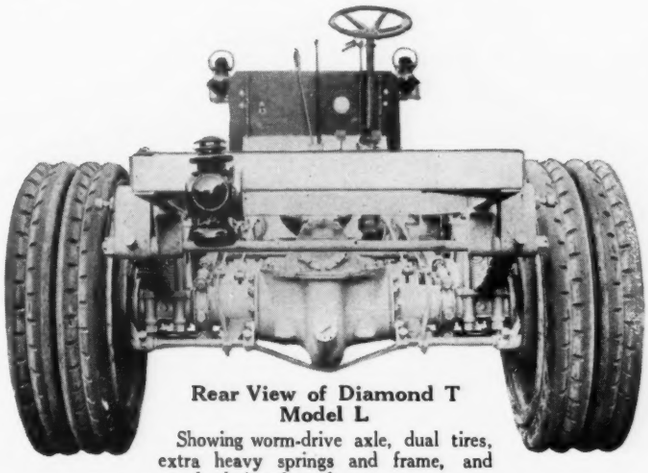
Braking system is Timken Duplex, double internal on rear wheels.

The radiator is made by the Long Manufacturing Co., and is of square tube, honeycomb type, with an extra margin of safety as to cooling. The radiator core and tank can be entirely removed from the outer shell by removing a few screws. This allows for simple and easy repairs without the necessity of expert help.



Diamond T Model L, Three and a Half Ton Truck

Shown fitted with stake body. Some of the standard parts used are Continental engine, Brown-Lipe clutch and transmission, Spicer universal joints, Timken axles, Bosch magneto and Rayfield carburetor. The price is $3300



Rear View of Diamond T Model L

Showing worm-drive axle, dual tires, extra heavy springs and frame, and sturdy design throughout

The radiator is set in special pressed steel channel and held in place by studs. The water is circulated by means of a centrifugal pump on the engine.

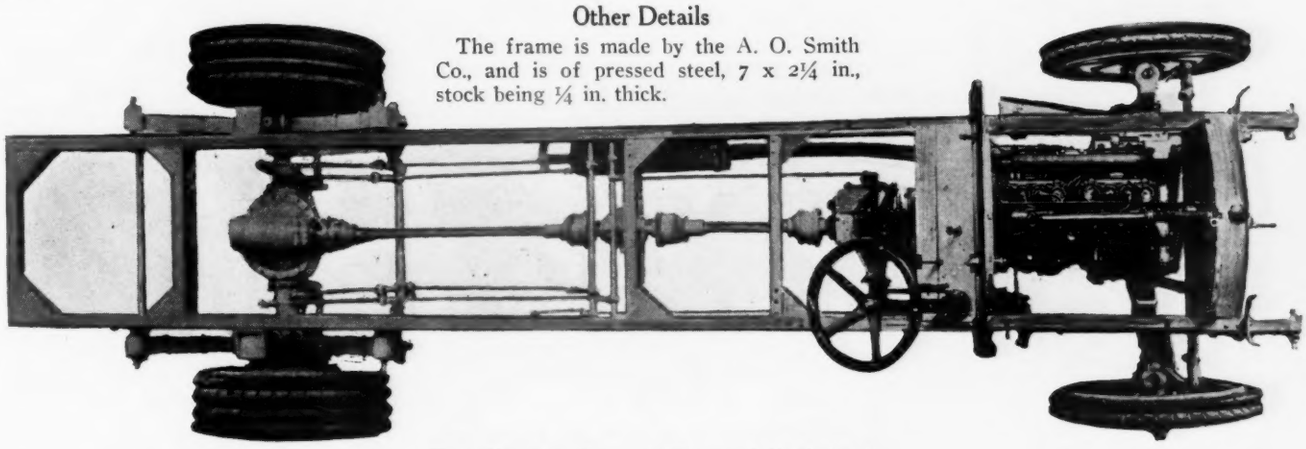
Ignition is by Bosch high tension magneto, type DU4; wheelbase 164 to 186 in., front tread 62 in., rear tread 66¾ in., right side steering, center control Gemmer steering gear, Rayfield carburetor with hot air intake and dash adjustment for starting.

Equipment includes governor, hubodometer, oil side and tail lamps, horn, complete set of tools, jack and tool box.

The governed speed is 12 m.p.h.

Other Details

The frame is made by the A. O. Smith Co., and is of pressed steel, 7 x 2¼ in., stock being ¼ in. thick.



Top Chassis View of Diamond T Model L

Showing strongly braced frame, divided propeller shaft with four universal joints and bearing in center to prevent whipping

The CCJ leads in circulation, advertising and prestige

Palmer-Moore Announces Two New Models

TWO new models with a capacity of ¾ and 1 ton, respectively, are announced for 1916 by the Palmer-Moore Co., of Syracuse, N. Y. The makers call particular attention to the standardized parts embodied in the design, which together with the special features, combine to make an interesting assembly. A definite impression of ample provision for excess strain is gained by a review of the major specifications.

Assuming that the average driver has a tendency to get the limit out of his truck, the company has allowed a generous margin for safety at all vital points. Pursuant with this policy, careful consideration has been given to the rear spring suspension. In addition to the standard semi-elliptic spring, a straight and underslung spring is carried and works in conjunction with it. This arrangement is stated to absolutely prevent the rear end from jumping up and throwing the load in the air. The advantage of this is readily apparent as it means that a fragile load can be safely carried on solid tires. The underslung spring is intended to act as a recoil spring, and as an auxiliary for excess loads. The rear spring front hanger is designed to take the driving thrust and prevent breakage of the spring eye.

Model K, Three-Quarter Ton Model

The engine is a Buda long stroke 3½ in. bore by 5⅛ in. stroke. It is of "L" head design, the four cylinders cast in block with removable top. Ignition is Bosch high tension magneto with special automatic spark advance.

Cooling is thermo-syphon. A dash board type radiator with seamless helical tubes provides ample cooling surface. With the radiator located back of the engine all of the power plant is instantly accessible. This is true of both models as it is unnecessary to remove the hood, radiator or underpan to reach any vital part of the power plant.

Left side steering through a Ross worm and nut type gear and 18 in. hand wheel is employed. One lever only (for throttle) on the steering wheel is provided, spark control being automatic. Gear shift and emergency brake levers are in the center. The usual pedals operate the clutch and service brakes.

Clutch is a special Borg and Beck multiple disc type in a separate unit from the transmission, being instantly accessible for inspection and adjustment.

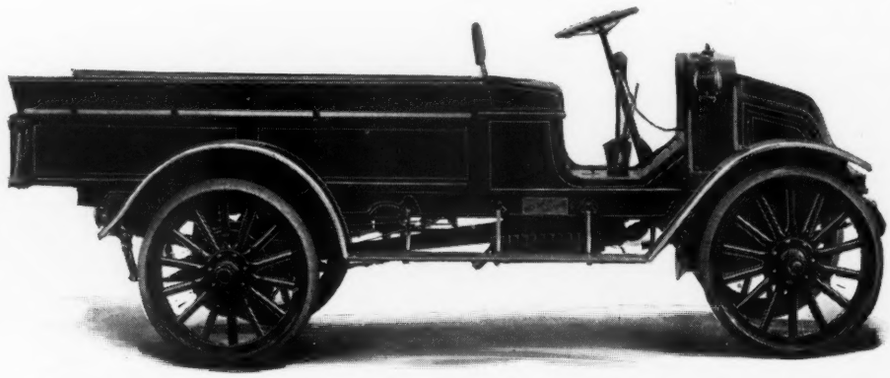
Transmission is Covert selective sliding gear, with three forward speeds and one reverse. All gears are nickel steel ⅞ in. face, carried on Hyatt roller bearings.

Straight line drive through two Spicer universal joints and 1¼ in. shaft to internal gear rear axle gives a direct gear ratio to rear wheels of 7:1.

Springs have been well designed all around. Front are semi-elliptic 38 in. by 2 in., eight leaves to each spring. Rear have eight leaves and are 50 in. by 2 in. Both the front and rear springs have a special non-slip feature. All spring bolts have grease cups.

Frame

The frame is Parrish and Bingham, combining strength and light weight. The parallel members are 3-16 in. pressed steel in channel section 38 in. wide and inswept to 33½ in. between front wheels. Total frame length is 156 in. Depth is 4½ in.



Palmer-Moore Open Express Body, Model K, Capacity Three-Quarter Ton

The engine in this model is 3½ x 5 in.; wheelbase 106 in.; weight 2800 lbs.; standard bodies are open express, stake (both types with or without driver's cab), express with full top, and full panel

The Celfor internal gear drive rear axle is one of the distinguishing points of the Palmer-Moore. A dead axle placed at the rear of the live one carries the load and takes all the road shocks.

Two sets of heavy brakes are fitted to the rear wheel drums, the emergency being of internal expanding type, 15½ in by 1½ in. The service brake is external contracting, 16 in. by 1¾ in.

Springs, Front Axle

The front axle is an I-beam section. Spindles are 1 37-64 in. by 1⅜ in. Bower roller bearings throughout.

Cross members and corners are gusseted and hot riveted.

Other Specifications

Wheelbase 106 in., tread 56 in.

Chassis weight is 2,800 lbs.

Loading space, standard, 7 ft. 6 in. long by 44 in. wide, back of driver's seat.

Fuel tank—12 gallons capacity.

Equipment—Oil side and tail lamps, complete set of tools in kit, horn, front and rear mud guards with aprons.

Side and storm curtains with all top and cab bodies.

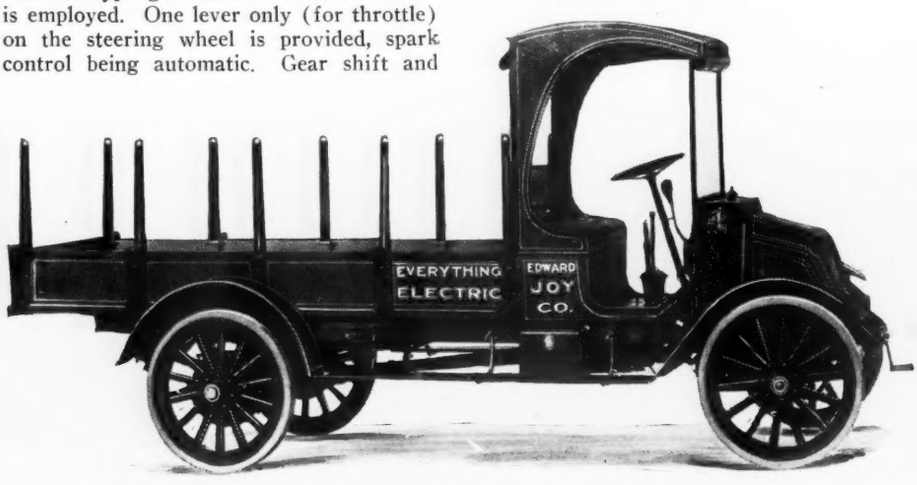
Wheels—Artillery type, fourteen 1¾ in. spokes, front and rear. Tires, front 36 in. by 3 in. Rear, 36 in. by 3½ in., motor truck type.

Prices of Three-Quarter Ton Models

Chassis with front body $1150
With open express, or stake body ..$1200
With express body with full top $1250
With full panel body $1300

Model M, One-Ton

The one-ton model differs from the ¾ ton mainly in the increase necessary to care for greater capacity. The engine is 3¾ in. by 5⅛ in., four cylinder L head. The frame is 180 in. long, and the distance back of the driver's seat is 10 ft. The wheelbase is 126 in. and the weight 3200 lbs. Tires are motor truck type, 36 in. by 3½ in. front and 36 in. by 4 in. rear. Other specifications are the same as for the ¾ ton.



Palmer-Moore Special Stake Body, Model M, Capacity One Ton

This truck has a wheelbase of 126 in.; engine is 3¾ x 5⅛ in. The chassis weight is 3200 lbs. Prices for this model: chassis with front body, $1350; with open express or stake body, $1425; with express body, full top, $1475; with full panel body, $1525.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

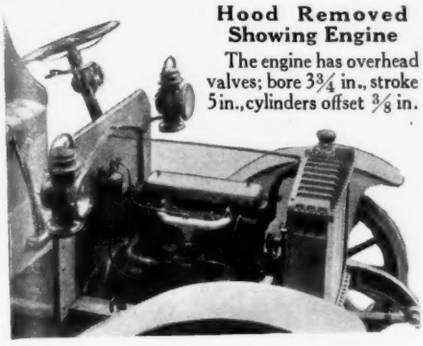
HAWKEYE MODEL "H," ONE AND A QUARTER TON TRUCK

THE Hawkeye Manufacturing and Repair Co., of Sioux City, Iowa, offers the Hawkeye Model "H" truck of 1¼ tons capacity, price $1250, f.o.b. Sioux City. The features are the four-cylinder overhead valve engine, developing 36 h.p., the internal gear drive rear axle, and the unit power plant. The loading space back of driver's seat is 8 to 9 ft.

Engine

The engine is a Beaver model M. L. C., described in our April issue, page 205. This model engine has over-head valves, bore 3¾ in., stroke 5 in. Cylinders are offset ⅜ in. Lubrication is by force feed and splash, cooling by centrifugal water pump and 14 in. fan. Radiator is tubular fin type. The carburetor is a Stromberg, of special compensating type fed by vacuum system from 15 gal. tank under seat. Ignition is by Eisemann high-tension magneto.

The clutch is multiple disc, dry plate type, raybestos on steel. Transmission is selective sliding gear type, with three speeds forward and one reverse. The unit



Hood Removed Showing Engine

The engine has overhead valves; bore 3¾ in., stroke 5 in., cylinders offset ⅜ in.

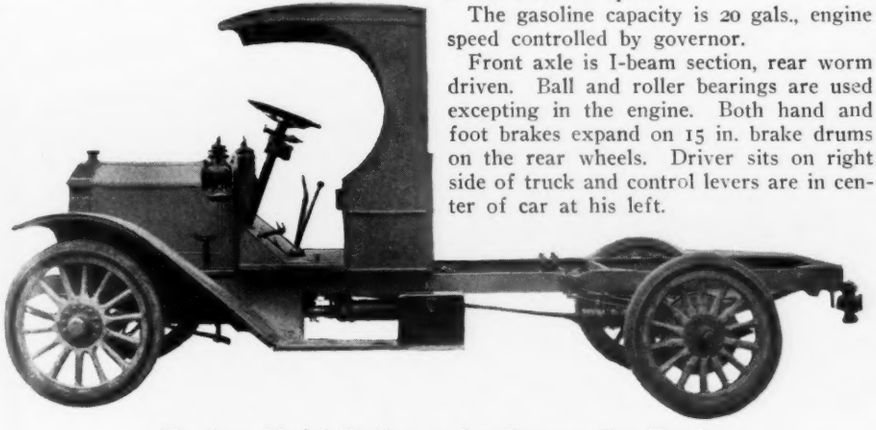
power plant has three-point suspension. Drive is by tubular propeller-shaft with two universal joints to the Celfor internal gear rear axle, with gear ratio of 7:1.

Brakes, Front Axle

Both sets of brakes operate on rear wheel drums, 16 in. in diameter, one set being internal expanding, the other external contracting.

Front springs are semi-elliptic, 38 x 2¼ in., with eight leaves, and rear are also semi-elliptic, 52 x 2½ in., ten leaves. All springs made of electric furnace steel. Wheels are artillery type, fourteen 2 in. spokes in each. Front tires are 34 x 4½ in. U. S. solid, and rear are pressed on, 34 x 5 in. solid.

Wheelbase is 130 in. Equipment includes three oil lamps and tools.



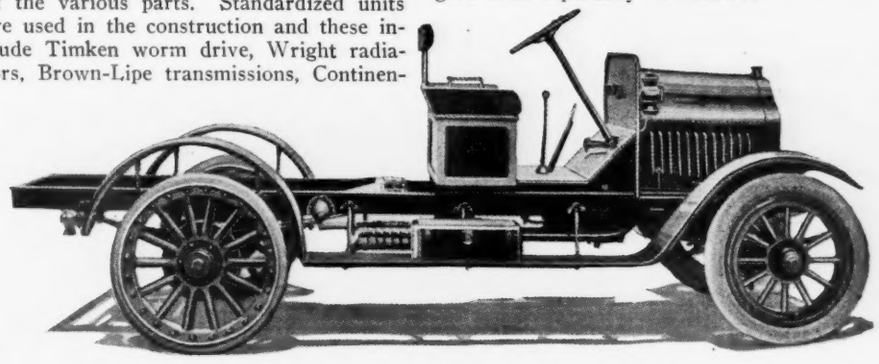
Hawkeye Model H, One and a Quarter Ton Truck

This chassis has four-cylinder, valve-in-head engine, 36 h.p.; unit power plant; dry disc clutch, and internal-gear type rear axle

LITTLE GIANT WORM-DRIVE MODELS

The Chicago Pneumatic Tool Co., Chicago, Ill., has announced two worm drive model trucks, known as Model 15, three-quarter to one-ton, and Model 16, two-ton capacity.

Both of these models are similar in general, the differences being mainly in size of the various parts. Standardized units are used in the construction and these include Timken worm drive, Wright radiators, Brown-Lipe transmissions, Continental engines, Schebler carburetors, Spicer universal joints, Eisemann magnetos, and Jacox steering gears.



Little Giant Model 15, Three-Quarter to One Ton

The price of this model is $1500. Standard units, such as Continental engine, Brown-Lipe transmission, Timken axles, etc., are used in the construction. The Model 16 is similar in appearance

Model 15, Three-Quarter to One Ton Capacity

Engine has four cylinders, 3½ in. bore and 5 in. stroke, cylinders being cast in block. S.A.E. rating is 22 h.p. and clutch and transmission are in unit, the whole power plant being three-point suspended. Carburetor is 1 in. size, cooling by cellular radiator, making use of the thermo-syphon system of circulation.

The clutch is of multiple disc dry plate type, the transmission being of selective sliding type, providing three forward speeds and one reverse speed.

The gasoline capacity is 20 gals., engine speed controlled by governor.

Front axle is I-beam section, rear worm driven. Ball and roller bearings are used excepting in the engine. Both hand and foot brakes expand on 15 in. brake drums on the rear wheels. Driver sits on right side of truck and control levers are in center of car at his left.

Springs are semi-elliptic all around, the front set being 38 x 2 in., rear 48 x 2½ in. Tires are pneumatic in front, 34 x 4½ in., solid in rear, 34 x 3½ in. Wheels are of artillery type with S.A.E. detachable bands. The chassis equipment includes the running gear, tires and spare rim, driver's seat, dash and foot boards, front and rear mud guards, side and tail lamps (combination electric and oil), 50 ampere hour storage battery, electric horn, jack, metal tool box and full set of tools.

The price f.o.b. Chicago Heights is $1500.

Model 16, Two Ton Capacity

As noted before, the general specifications of Model 16 are very similar to that of Model 15. There are, however, a number of exceptions in the size, etc., and we give these separately as follows:

The hand brake is internal expanding, the front brake being external contracting, both operating on a 172 in. brake drum on the rear wheels, and both sets equalized. The carburetor on this model is 1¼ in. The cooling system also makes use of a cellular radiator. A gear driven centrifugal pump is used to circulate the water, instead of a thermo-syphon, as in the smaller model. The Continental engine has a bore of 4⅛ in. and stroke of 5¼ in., the S.A.E. rating in this case being 27.2 h.p. The speed of the engine is governed to 1100 r.p.m. as in the smaller model, but owing to a difference in gear ratio, this limits the speed on high gear to 15 m.p.h. Springs are 40 x 2½ in. front and 56 x 3 in. rear.

The tires on this model are solid, both front and rear, the front set being 36 x 4 in. single, rear set being 36 x 3½ in. dual. The water capacity is 8 gals.

The price of this model is $2500.

Other Details

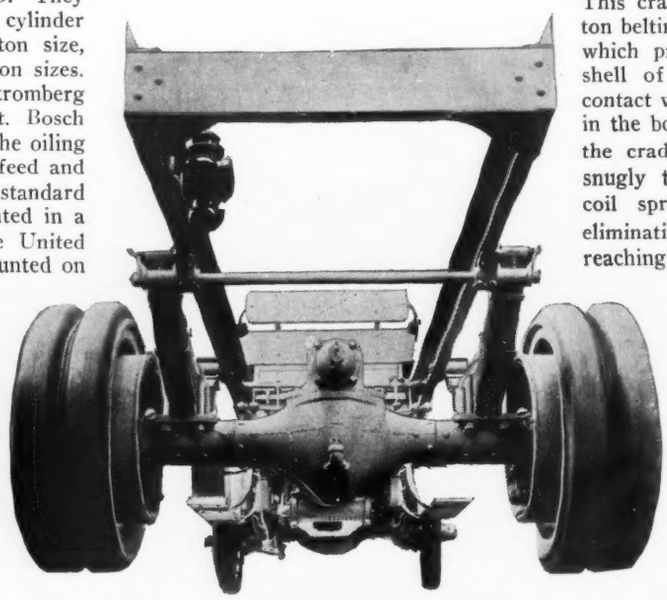
It should be noted that on the Model 15 the wheelbase is 120 in., the Model 16 being 144 in. On Model 15 the length of chassis over all is 179¾ in., length of frame back of driver's seat 87¾ in. Over all width of chassis outside of fenders 67 in., height of frame from ground, loaded, 28 in., tread 56 in., both front and rear.

On the Model 16 the length of chassis including bumper is 212 in., length of frame back of driver's seat 116½ in., over all width of chassis outside of fenders 69½ in., height of frame from ground, loaded, 31 in., tread 58 in. front, 58¼ in. rear.

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

U. S. Worm-Drive Trucks in Three Models

IN addition to the line of chain drive trucks, the United States Motor Truck Co., Cincinnati, O., and Covington, Ky., is placing on the market for the 1916 season three worm driven models, known as models H, J and K, the capacity being 2, 3½ and 5 tons, and the prices $2500, $3150 and $4000, respectively. These trucks follow very closely the general line of construction used in the chain drive models E and D. They are equipped with Continental four cylinder engines, 4⅛ x 5⅛ in. on the 2-ton size, 4½ x 5½ in. for the 3½ and 5 ton sizes. These engines are equipped with Stromberg carburetors and hot air attachment. Bosch magneto furnishes the ignition. The oiling system is a combination of force feed and splash. While this engine is a standard Continental engine, yet it is mounted in a manner which is peculiar to the United States Motor Truck Co. It is mounted on an independent steel sub-frame, to which it is securely bolted. The sub-frame is in turn suspended at each side of the front and between heavy vanadium steel coil springs which absorb all road shocks. The rear end or third point of support is a 5 in. ball working in a socket in the center of the main frame. This works in any direction without throwing any strain whatever on the power plant. This "floating power plant" is not only an exclusive feature, but it is also a construction of great value because crankshaft allowance cannot be broken, the crankshaft cannot bind, the crankcase cannot be twisted and cracked, and power cannot be wasted through unnecessary friction.



Rear of U. S. Motor Truck

Showing top, worm-drive axle, semi-elliptic springs, dual rear tires, heavy spring clips, generous size brake drums, and other details

Transmission and Clutch

The clutch is of cone type faced with mineral tanned leather and equipped with a ball bearing release flange.

The transmission is of sliding clutch type, providing three speeds and reverse, the gear faces being 1⅛, 1¼ and 1½ for the 2, 3½ and 5 ton sizes respectively. This transmission is unique in that there is no shifting of gears. The gears are always in mesh and are mounted on roller bearings. The change from one speed to another is made by shifting dog clutches. On the side of the gear is cast integral with it eight or more heavy lugs or dogs. A corresponding set is keyed to the shaft and when the change of speed is made, these dog clutches are shifted into each other where the strain is distributed between eight or more heavy lugs. The transmission is also mounted on the frame on a three point suspension, thus guarding it against strain, due to the distortion of the main frame.

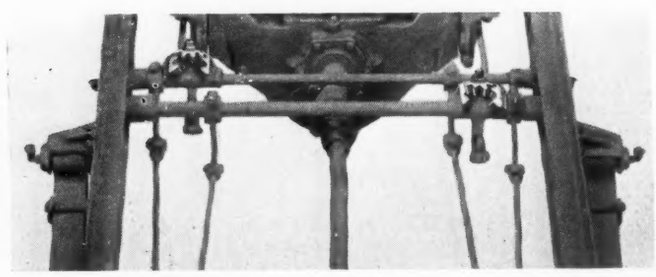
An automatic locking device on the change speed lever prevents an ignorant or careless driver from changing gears while the clutch is engaged, and is a still further protection to the transmission gears.

Radiator Mounting

The radiator, which is of the latest improved design, is mounted in a steel cradle. This cradle is lined with anti-friction cotton belting, treated to exclude moisture and which prevents any portion of the brass shell of the radiator from coming into contact with it and so cause chafing. Studs in the bottom of the radiator pass through the cradle and all parts are thus drawn snugly together. Double vanadium steel coil springs carry the whole assembly, eliminating strains and preventing jars from reaching the radiator.

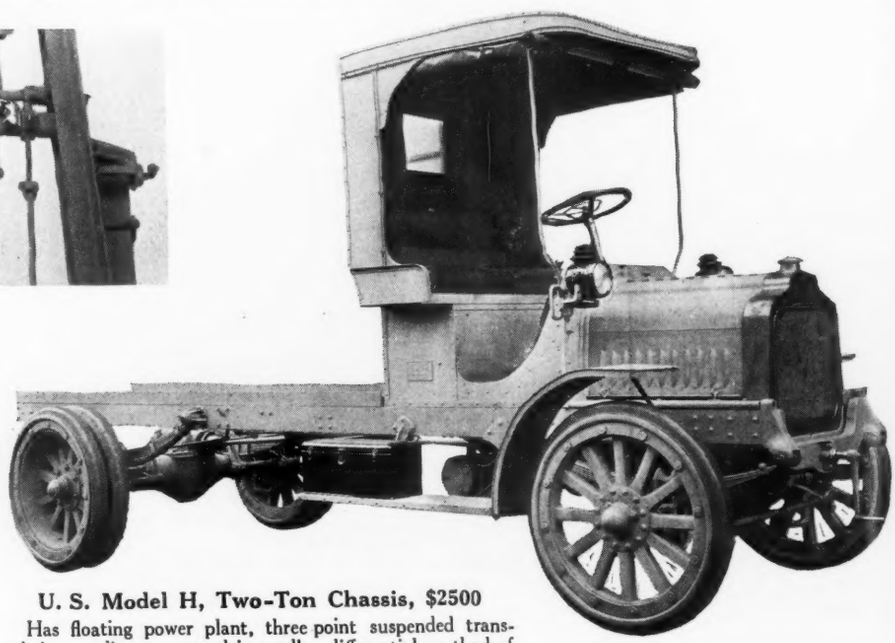
Brake Construction

A clever method of equalizing the pull on the two brakes is employed. This is not new on these trucks, but is worthy of special mention in that a differential action is attained by the use of a bevel pin and sector arrangement both on the service and emergency brake rods. A short cast steel sleeve has an integral, toothed bevel sector. The sleeve carries the end of the shaft loosely and is provided with a thrust arrangement. Keyed to the shaft is a second sector which is so spaced as to match a bevel pinion which is carried



U. S. Differential Brake-Equalizing Device

Showing how the brakes are equalized by a gear and pinion arrangement



U. S. Model H, Two-Ton Chassis, $2500

Has floating power plant, three point suspended transmission; radiator mounted in cradle; differential method of equalizing brakes and cone clutch

on the upper portion of a lever that pivots loosely on the shaft between the sectors. This lever has the regular form of pull rod connection with the control up ahead, and on either end of the shaft assembly is a lever which connects to the brake on that side in the regular way. When force is applied to the brakes it acts upon the lever that carries the bevel pinion with sectors and shaft related, and this continues until resistance is effected by one or both brakes being engaged. But should resistance of one break take place somewhat ahead of the other, motion through the bevel pinion is caused on the opposite sector until it is also engaged, when the differential movement ceases and equal force is applied to both brakes.

Final Drive

United States trucks use what is known as the Hotchkiss type of drive, in which the driving strains and the torque are taken through the springs, thus eliminating all radius and torque rods. Sheldon rear axle and springs are used on all of these worm drive models. The design is such that when the truck is under its rated load, the engine shaft and all driving shafts are in perfect line.

Specifications

The general specifications of these three models can be readily seen from the following table:

Engine	Model H Continental	Model J Continental	Model K Continental
H.P.	27.2	32.4	32.4
Bore	4⅛	4½	4½
Stroke	5¼	5½	5½
Radiator	Ver'l Tube	Ver'l Tube	Ver'lTube
Front Tires....	34 x 4	36 x 5	36 x 5
Rear Tires.....	36x4 Dual	40x5 Dual	40x6 Dual
Capacity	2 tons	3½ tons	5 tons
Body Allowance	1200 lbs.	1800 lbs.	2000 lbs.
Wheelbase	144 in.	....	174 in.
Chassis Weight.	5700 lbs.	7300 lbs.	8500 lbs.
Chassis Price...	$2500	$3150	$4000

Other Details

Specifications which are the same for all three models are as follows: Worm and sliding block type steering gear, with right and left side drive and center control; 20 gal. gasoline tank; semi-elliptic springs; artillery type wheels; complete equipment consisting of seat cushions, front fenders, oil dash lamps and tail lamp, horn, set of tools, jack, tool box, battery box on running board and hubodometer.

Burtless Service Truck

The Burtless Motor Sales Company, Grand Rapids, Mich., is specializing on service to the owner. Only expert mechanics are employed, work is guaranteed, and any make of truck may be repaired. A complete assortment of parts of Menominee trucks is carried in stock, and the relief truck shown above is at the disposal of customers when their own trucks are out of commission.

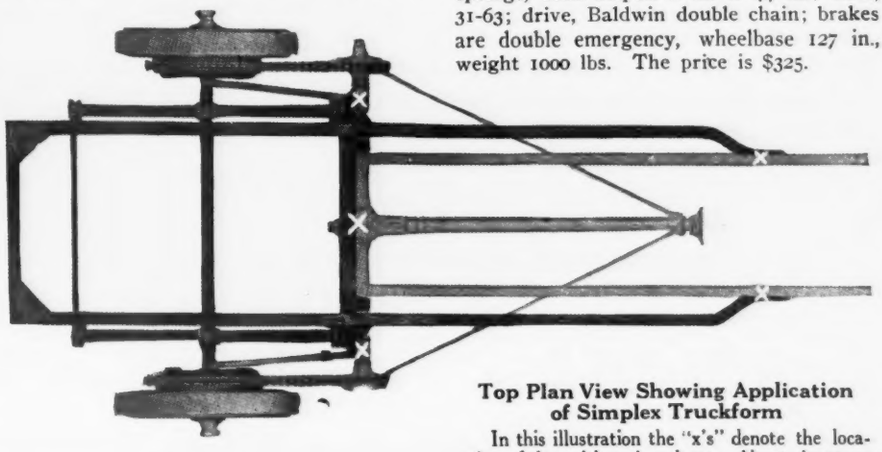
THE RAYFORD TRUCK ATTACHMENT

The Rayford attachment for converting a Ford into a 1-ton truck is offered by the Rayford Co., Second Street and Indiana Avenue, Philadelphia, Pa. The unit consists of a heavy pressed steel channel section auxiliary frame which is securely bolted to the Ford frame, taking up the load, propelling and braking strain. This frame parallels the Ford frame from the radiator to full 5 ft. beyond the present Ford rear frame member, giving a net frame length back of front seat of 8 ft., upon which a body of 10 ft. back of seat may be mounted. Attached to this frame by semi-elliptic springs is a drop forged I-beam solid rear axle with artillery type truck wheels, twelve square spokes 1¾ in. thick. Drive is secured by heavy roller type Baldwin chains and sprockets. Front sprockets have twenty-four teeth and are attached to the Ford rear hubs displacing Ford rear wheels, which are placed on front to utilize the ½ in. larger tires. The complete Ford rear axle is retained without alteration. Gear ratio is standard 2 to 1, reducing the car speed to 20 m.p.h. Both foot and emergency brake levers operate directly on expanding shoes in rear wheels. Drums are 12 in., shoes 2½ in., Staybestos lined. Frame length overall is 160 in., width is 32 in. The wheelbase is 124 in., and the tread is standard, 56 in. For Southern trade 60 in. is specified. The maker states that the load carrying solid rear axle is so placed as to carry 90 per cent. of dead load, and tests upon the scales show that front axle is called upon to do no more work than as a touring car. The rated load is 1 ton subject to an overload of 50 per cent. The complete attachment weighs 1000 lbs. and is shipped knocked down, thereby earning a low freight rate. The list price of the Rayford is $275.

The Rayford Commercial Truck Attachment

SIMPLEX TRUCKFORM

Anticipating the increased demand for a 1-ton Ford truck attachment The Simplex Truckform Co., 115 South Dearborn Street, Chicago, Ill., is manufacturing a double chain drive assembly that is claimed to be of sufficient strength and design to carry 50 per cent. overload. The makers lay particular emphasis on the fact that the truck form may be readily attached as there is no change in the Ford frame or axle. The 4 in. channel steel frame is secured to the Ford chassis by means of five quick action clamps and the Ford rear wheels are replaced by two small sprockets connecting the truck axle with double side chains. Specifications are as follows: Carrying capacity, 2000 lbs.; frame, 4 in. channel steel 34 in. wide; axle 1¼ x 2 in.; solid rubber, 32 x 3½ in.; sprocket ratio, springs, semi-elliptic 2 in. x 44 in.; tires, 31-63; drive, Baldwin double chain; brakes are double emergency, wheelbase 127 in., weight 1000 lbs. The price is $325.



Top Plan View Showing Application of Simplex Truckform

In this illustration the "x's" denote the location of the quick-action clamps. About ninety per cent of the load is carried on the rear axle.

The CCJ has most advertisers because it gives them biggest returns

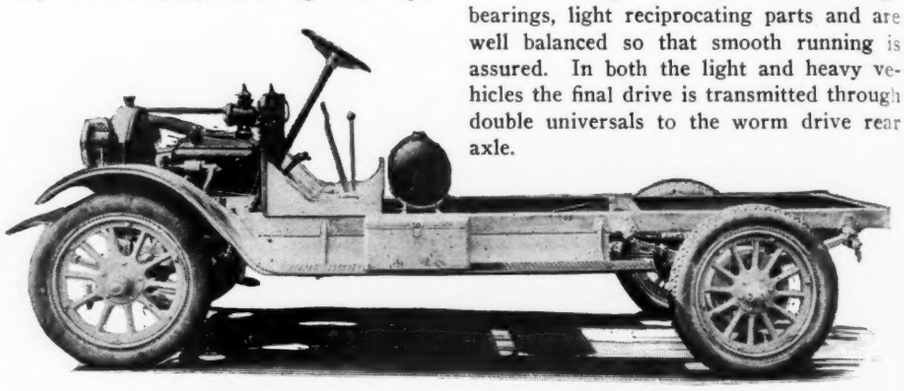
The Wilcox 1916 Truck Line

FOR the 1916 season the H. E. Wilcox Motor Co., Minneapolis, Minn., is marketing five different models. The three-quarter and one ton are of similar designs, as are the one and one-half, two and three and one-half ton sizes, differences being only those made necessary by great capacity and larger wheelbase. The highly efficient unit power plant includes a multiple disc clutch of the dry plate type. The total gear reductions on all sizes are exceptionally low. All brakes are internal, of simple and effective design. Pneumatic tires of ample size are standard equipment on a three-quarter ton, the one-ton tire equipment being optional as to solid or pneumatic, and for those of greater capacity the solid tire is recommended.

The heavy duty units, namely one and one-half, two, and three and one-half tons, are the three sizes which were first manufactured by the Wilcox Co. and upon which its reputation as a successful motor truck builder was established. Fully 85 per cent. of the parts used in the construction of these trucks are manufactured by the Wilcox Co. themselves. The frames are all of a special alloy steel for truck purposes. All load carrying parts are of unusual strength, and, in fact, the complete vehicles are known to have considerable reserve capacity.

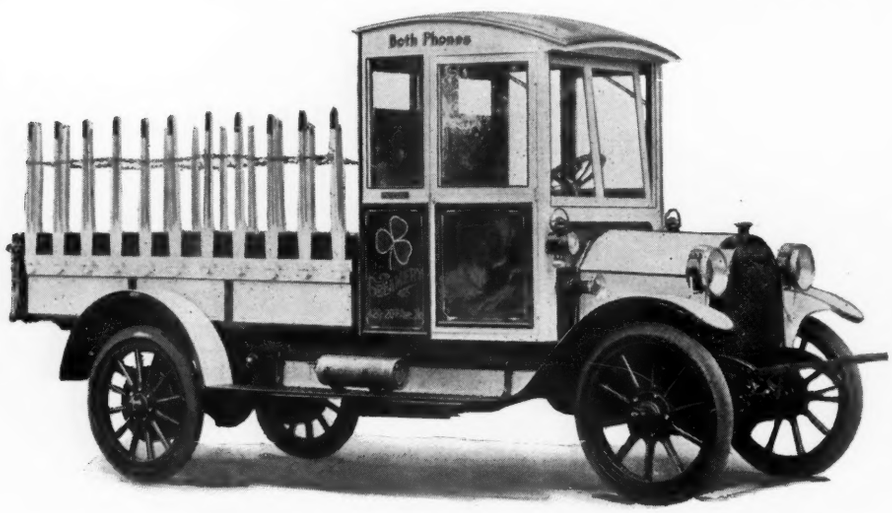
Transmissions of the Models "R," "Q" and "P" are assembled on the frame proper and mounted at three points, equipped with Timken roller bearings throughout, arranged for easy adjustment. The transmission case is of malleable iron, non-destructible. Transmission gears are turned from solid Nikrome steel, heat-treated and hardened.

To promote safety and increase efficiency, each model is equipped with an automatic governor which controls the intake of gas, thus affecting the speed of truck according to size. The power plants in the heavier trucks develop 40 h.p., being especially adapted to the purpose, owing to the special exclusive features; for instance, the crankcase is of manganese bronze, three-bearing crankshaft, drop forged, of carbon steel, all working parts completely enclosed. In short, the Wilcox truck engines have exclusive hard service features, such as extra large wearing surfaces, large bearings, light reciprocating parts and are well balanced so that smooth running is assured. In both the light and heavy vehicles the final drive is transmitted through double universals to the worm drive rear axle.



Wilcox Model U, Three-Quarter Ton Chassis

Fitted with pneumatic tires; Continental 3½ x 5 in. four-cylinder engine; 20 gallon gasoline tank, and has 120 in. wheelbase and 56 in. tread



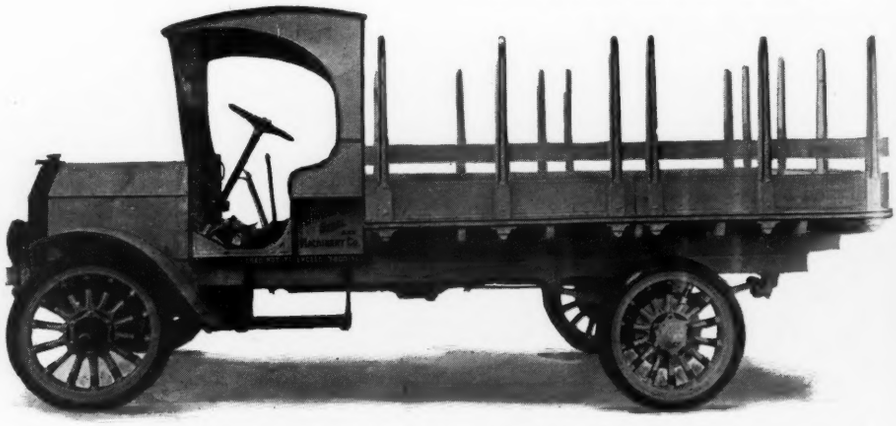
Wilcox Model S, One-Ton, Used by Creamery

Equipped with closed cab. This model has 128 in. wheelbase; Continental 3¾ x 5 in. engine; chassis weight, 2800 lbs.; chassis price, $1600

The H. E. Wilcox Motor Co. is one of the pioneers in the business and has a permanent organization equipped to adequately supply motor trucks for superior hauling efficiency, and its trucks at present are to be seen in over 200 various lines of business.

Model "U" Three-Quarter Ton

In this model the front axle is a Sheldon, drop forged, of "I"-beam section, the wheels being mounted on taper roller bearings. The rear axle is a Sheldon worm gear unit, with an extra heavy one-piece housing, the construction being semi-floating and provided with roller bearings. The reduction is 6.2:1. The worm is of special heat treated steel, ground by special machinery, while the axle worm wheel is of special forged bronze with 1¾ in. face. Both sets of brakes are internal expanding, operating on 14 in. transmissions, fitted to the rear wheels. All brakes are enclosed, protecting them from dirt and grit.



Wilcox Model R, One and a Half Ton Stake

Worm drive; cone clutch; centrifugal governor, limiting engine speed to 1100 r.p.m.; Wilcox design and constructed engine, four cylinders, 4¼ x 5 in.; three-speed selective transmission; and 134 in. wheelbase

The engine is a Continental, four-cylinder, 3½ x 5 in. member, developing 28 h.p. at 1500 r.p.m. It is fitted with either Rayfield or Stromberg carburetor equipped with hot air intake to exhaust manifold. Clutch is of multiple disc dry plate type, the disc being lined with heatproof facing. Transmisson is of selective sliding gear type, providing three speeds forward and reverse. Timken roller bearings are used in transmission, and the first speed gives 20.6:1, second speed 10.4:1, third speed 6.2:1, and reverse 26.9:1. These reductions at 1200 r.p.m. correspond respectively to 7.2, 14.3, 20 and 4.1 m.p.h.

Engine cooling is by thermo-syphon system, in connection with a tubular radiator which provides an ample area of cooling surface. Direct shaft drive is used from the unit power plant through double universal joints to the worm gear rear axle, which, as previously stated, is of the semi-floating type. The frame is pressed steel, heat treated, with channel section side members 4⅛ in. deep, 1½ in. flange, 7-32 in. stock.

Other Details

Ignition is by Bosch magneto; springs semi-elliptic front and rear; worm and wheel irreversible type steering gear with 18 in. hand wheel, and spring shock compensating connecting in steering reach rod. Pneumatic tires front and rear 35 x 4½ in. The turning radius on the standard chassis is 30 ft. depending upon tire equipment; chassis weight 2300 lbs.; artillery type wheels of second growth hickory.

Some of the general dimensions are as follows: 20 gal. gasoline tank, length of frame back of driver's seat 10 ft. 4 in., height of frame loaded 27 in. length over all 14 ft. 3 in., tread 56 in., wheelbase 120 in., width of frame 32 in.

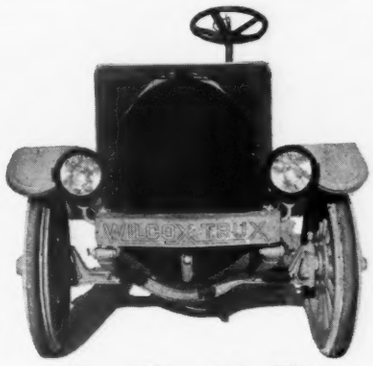
Model S, One-Ton

On this model the axle worm wheel has a 2 in. face. The reduction is 6.5 to 1. The frame in this case is 4 5-16 x 2½ x 7-32 in. stock. The engine also is a Continental, but the bore is 3¾ in. and stroke 5 in., developing 32 h.p. at approximately 1500 r.p.m. The tires are pneumatic, 35 x 5 in. front and rear, or solid 34 x 3½ in. front and 34 x 4 in. rear. The transmission also has three speeds forward and reverse, but the total reductions are 24.6 to 1, 10.92 to 1, 6.5 to 1 and 28.27 to 1 on first, second, third and reverse speeds. These ratios correspond to 5.5, 11.3, 18 and 4.4 m.p.h. at 1200 r.p.m. of the engine. The price of this model is $1600 f.o.b. factory, chassis painted in lead and regular equipment. For complete electrical starting and lighting device $100 is added to the list.

Some of the general dimensions on this model are as follows: length from dash to rear of frame 11 ft. 3 in., length over all 15 ft., tread 55⅝ in. front, 57 in. rear, wheelbase 128 in., width of frame 34 in. Most of the other specifications are similar to the model "U."

Model R, One and a Half Ton

The axle worm wheel has a 2½ in. face and the reduction is 7.7 to 1. The clutch is cone faced with heat and moisture proof material and equipped with spring actuated plungers, allowing gradual engagement. The engine is of Wilcox design and construction, four cylinders, cast in pairs, 4¼ in. bore, 5 in. stroke, developing 40 h.p. at 1100 r.p.m. The working parts are completely closed and dust and waterproof detachable plates are provided for the protection of the valves and push rod mechanism. The crankcase is of manganese bronze, and the oil pan, which is separate, is of aluminum. The crankshaft is a heat treated drop forging and has three bearings carried on the upper half of the crankcase. The connecting-rods are of I-beam construction from 35 per cent. carbon steel drop forged and heat treated. The radiator is of vertical tube type, being double-action, spring suspended, and on this model positive circulation is assured by a gear driven centrifugal pump. Cooling is further assisted by belt driven ball bearing fan.



A Front View of the Wilcox

Solid tires are standard equipment on this model, the front set being 36 x 4 in., rear 36 x 5 in. The transmission is of Wilcox design and construction, located amidships, is of selective type, three speeds forward and reverse. The gear ratios are 37.9 to 1, 15.2 to 1, 7.7 to 1 and 47.9 to 1 on first, second, third and reverse speeds respectively. The turning radius is 32 ft., weight of chassis 4100 lbs., wheelbase 134 in., tread 58 in. front, 58⅝ in. rear, length over all 16 ft. 6¾ in.

Model Q, Two-Ton

The clutch on this model is a cone, the same as the previously mentioned model. Cooling is by centrifugal pump, frame 5 x 2½ x ¼ in. stock, and the engine is the same as the one used in the model "R." Tires are 36 x 4 in. front, 36 x 3½ in. dual in rear. The steering gear is fitted with 20 in. hand wheel and final gear ratios are 42.48 to 1, 15.68 to 1, 8.6 to 1 and 54.64 to 1 for first, second, third and reverse speeds respectively.

Chassis weight is 4700 lbs., price of chassis in lead $2000 f.o.b. factory, $175 extra for complete electrical starting device and generator. The tread is 58 in. front, 58⅝ in. rear and wheelbase is 150 in.

Model P, Three and a Half Ton

The rear axle reduction is 11.7 to 1 on this model, the worm wheel having a 2½ in. face. Cone clutch is used, centrifugal pump with vertical tube radiator for cooling, and pressed steel frame 6 x 2½ x ¼ in. stock. The same equipment is used on this model as is used on the two previously mentioned models. Tires are 36 x 5 in. front, 36 x 5 in. dual in rear. The transmission is also of Wilcox design and construction, and final gear ratios are 40.59 to 1, 21.64 to 1, 11.7 to 1 and 51.24 to 1 for first, second, third and reverse speeds respectively.

The chassis weight is 6300 lbs. and chassis price $2900 in lead f.o.b. factory, $125 being the extra for complete electric starting device and generator. Tread is 58 in. front, 66 in. rear and wheelbase 160 in.

Bodies and Tops

The Wilcox Co. provides a number of standard canopy and buggy tops for the different models, prices, including curtains, being $30. The standard enclosed cab is $80 and the standard open cab is $45 with curtains.

Various types of bodies, including flare board, covered flare board, covered flare board screen side, steel panel body, open stake, covered stake, special stake, farm body, bus and bakery panel may be had at prices ranging from $100 to $600.

BOOK REVIEW

Motor Trucks of America, Vol. IV. This valuable hand-book just off the press is bigger and better than ever. All the principal motor trucks made in the United States are represented by illustrations and full tables of specifications covering all models. The specifications are arranged after a uniform plan, so that one truck can be readily compared with another. This book is not for sale, but is published annually by the B. F. Goodrich Co. for free distribution not only to truck manufacturers, agents and salesmen but to truck owners as well, and business firms contemplating the purchase of trucks. Requests should be written on business letterheads and addressed to the B. F. Goodrich Co., Akron, O., or the nearest Goodrich store.

A Fleet of Wilcox Trux, Model U, Three-Quarter Ton Capacity

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

The Xtend-A-Ford Outfit

ANOTHER scheme for utilizing the universal chassis, the well-known Ford, for commercial purposes, is an outfit recently placed on the market by the Xtend-A-Ford Co., 1416 Wallace Street, Philadelphia, Pa. This outfit, as the name suggests, extends the Ford chassis to either 115 or 130 in. wheelbase from the 100 in. wheelbase of the original Ford car.

The accompanying plan view of the extended chassis shows the various parts which are included in this outfit. In the first place, the frame is prolonged by right and left frame extension pieces. In order to do this, it is only necessary to chip off the heads of the bolts fastening the original Ford side frame members to the rear cross frame member and then bolt the extension pieces to the side frame members. These extensions are made to fit

Xtend-A-Ford Frame Extension

exactly to the Ford frame. A piece 14 in. long lying within the channel flat against the vertical web for strength, while the extension part is channeled the same size as the Ford side frame member, and being a steel casing, it has cast integral with it an ear which bolts to the rear of the rear end of the Ford frame. At the extreme ends of the extension are also ears and the ends are so shaped that they fit exactly against the rear cross frame member of the Ford frame, which is then placed in position at the ends of the extension.

The entire rear axle member is moved backward either 15 or 30 in., according to the length of the extending outfit. The forward end of the propeller-shaft housing is then supported by a special pressed steel cross frame member bolted to the side frame members.

Propeller-Shaft Extension

The distance from the front end of the original propeller-shaft to the back end of the transmission is then filled by a propeller-shaft extension with special universal joints at each end of it, thus taking care of any misalignment of the frame, either in assembling or due to road inequalities. This shaft is ⅜ in. in diameter and tubular, being very light, yet strong. The universal joints employed also act as slip joints and the special claim is made for them that when the shaft is transmitting its full torque, it can be moved forward or backward with the fingers. This freedom from bind is brought about by having the cross-arms of the universal fitted with hardened steel rollers of spherical form which are encased in a housing of similar shape, so that a slipping action in this joint is really a rolling action of these hardened rollers inside of their housing, which, of course, is packed with lubricant.

Method of Connecting to the Transmission

An interesting construction is the connection of the forward universal joint to the rear of the Ford transmission, on which mechanism patent claims have been allowed, and patents are pending in foreign countries. The parts are shown in an accompanying cut. A short studshaft extends its hardened square end into the rear of the Ford transmission. This shaft protrudes outward through a bronze plate which is bolted to the rear of the transmission case. This plate is grooved and contains a felt washer, the plate having a bearing surface on an enlarged integral collar of the studshaft. This prevents oil leakage. The outer end of the shaft is also squared and passes through a squared hub of another plate, retained in place by a nut on the threaded end of the studshaft. This last plate bolts directly to the flange of the universal joint.

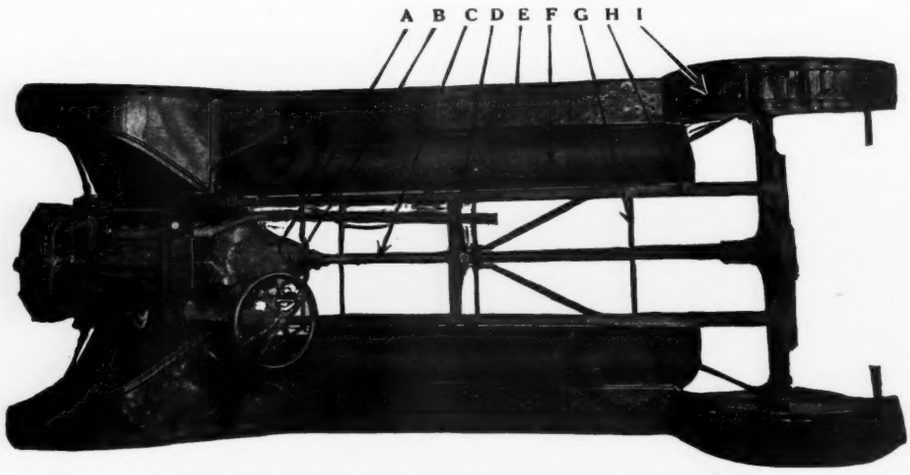
Stud Shaft and Connections to Ford Transmission

The outfit includes not only the extensions to the frame and the propeller-shaft extensions with universal joints and the connections just described to the transmission, but two rear fenders of commercial type; new metal running boards of the proper length; also running board aprons; an extra running board truss rod passing crosswise under the frame; extensions for the brake rods and a new cross frame member supporting the forward end of the propeller-shaft.

This outfit complete weighs less than 80 lbs. and converts the Ford into a light commercial delivery wagon to be used up to 1000 lbs. capacity. The dealer, of course, also has the rear fenders, steps or running boards, and shields that are taken off from the regular chassis, which he can sell or use for Ford repair work.

The company also supplies various types of bodies, including panel, 6-post express and quick detachable open box body and also a special undertaker's and an ambulance body. These bodies, on the 130 in. wheelbase, give a loading space back of the seat of 90 to 100 in. and a width of 41 in. and sell in quantities, at about the same prices as other Ford bodies.

The sills of the bodies are made of 2 x 3 in. ash and bolted at four points on each side to the side frame members, thus reinforcing and strengthening them. The 15 in. extension sells for $67.50 and the 30 in. extension for $75, or $87.50 and $95 respectively if a Bailey gearless differential is also supplied for the rear axle.



Plan of Xtend-A-Ford Chassis, Showing the Parts Used

A, stud shaft to connect propeller shaft to transmission (inside of transmission case); B, bearing plate for end of transmission; C, propeller-shaft extension with universal joint; D, cross frame member to support front end of rear construction; E, runningboards of required length; F, runningboard aprons of required length; G, extra runningboard truss rod; H, right and left frame extensions; I, two rear commercial fenders; extension for brake rods, and all necessary bolts and nuts.

DEALER'S CARD ON DRIVER'S WHEEL SOLD EIGHTY-FIVE DOLLARS WORTH REPAIR PARTS

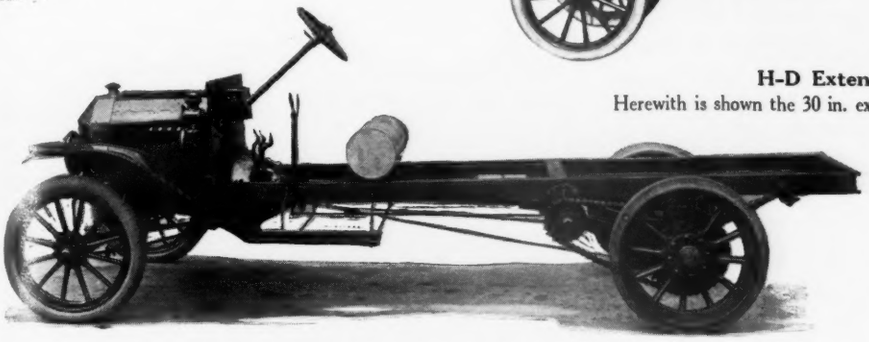
Edward Crowley, president of the Motor Truck Sales Co. in Los Angeles, which is distributor for the Garford Motor Truck Co. and carries locally at all times repair parts for all Garford touring cars, Gramm, Willys Utility and Garford trucks, sold $85 worth of repair parts within ten minutes of placing a little direct advertising of the simplest kind. Passing a Gramm truck on the street, Mr. Crowley stepped up and placed under the gas control on the wheel his personal card on which he had just written, "We carry full line of Gramm parts—see us." Within ten minutes the owner of the truck was in the sales room of Mr. Crowley's establishment and Mr. Crowley, having returned, had the pleasure personally of receiving an order for $85 worth of repair parts. "It pays to advertise," says Crowley.

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

ROTHWEILER TRUCK ATTACHMENT FOR FORDS

Rothweiler & Co., 1830 Broadway, Seattle, Wash., has introduced a truck attachment, selling for $360 designed for Ford cars. The auxiliary channel steel frame is designed to surround the Ford frame, thus converting it into a 1-ton truck that provides a loading space 8 ft. long, back of the driver's seat. Direct shaft drive to differential jackshafts and double chain drive to rear wheels is employed, gear ratio being 7:1 on high gear and 18:1 on low. Brakes are internal expanding type, in drums. Rear axle is one-piece vanadium steel, 1⅞ in. cross section. Rear springs are semi-elliptic and are stated to be of ample strength and resiliency.

According to the maker's figures this type of truck carries 60 per cent. of the chassis weight and approximately 80 per cent. of the loaded weight on the rear axle, placing practically no more weight on the front end than does the fully loaded Ford touring car. The weight of the attachment is 960 lbs.



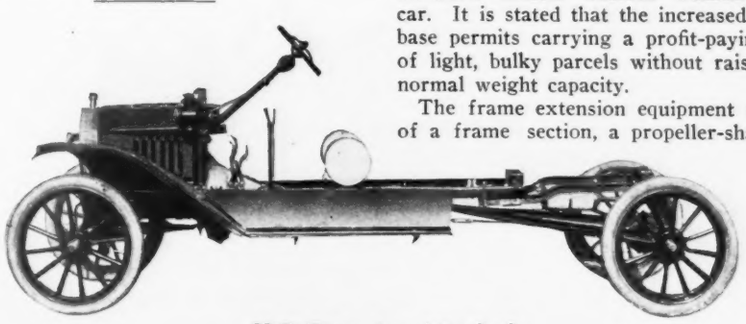
Rothweiler One-Ton Truck Attachment

This illustration shows how the Rothweiler attachment is built around the Ford frame. The rear wheels are of the artillery type, fitted with S.A.E. rims and 32 x 3½ in. solid tires

THE H-D EXTENSION FOR FORD CARS

To provide loading space back of the driver's seat for commercial usage The Hayes-Diefenderfer Co., 237 West 55th Street, New York City, is making a Ford rear extension designed to lengthen the standard chassis without weakening the car. It is stated that the increased wheelbase permits carrying a profit-paying load of light, bulky parcels without raising the normal weight capacity.

The frame extension equipment consists of a frame section, a propeller-shaft extension, a tubular propeller-shaft housing extension and the necessary equipment for lengthening brake rods, nuts, bolts, etc. The H-D extensions are made in two sizes. One to increase the wheelbase 15 in., from 100 in. to 115 in., price $45. The other increases it 30 in., from 100 in. to 130 in.; price is $50. The company also make a seven-passenger detachable Ford tonneau that can be fitted to any 1915 or 1916 Ford runabout.



H-D Extension Attached

Herewith is shown the 30 in. extension as attached to Ford Chassis

TRACTOR HAULS TWENTY-SIX TONS OF LUMBER

Used in a tractor, the gasoline engine is capable of performing prodigious hauling feats at comparatively small cost. A well-known Detroit lumber dealer, Charles W. Kotcher, recently wrote to the E. T. Towar Co., of Detroit, the local agent for Knox tractors, in regard to the heavy tonnage which he has found it possible to handle most expeditiously and economically with a Knox tractor and semi-trailer combination, used in connection with several horse-drawn vehicles which were pressed into service as trailers.

In speaking of this haulage feat Mr. Kotcher said: A short time ago we unloaded a car of 1 x 4 white pine strips, which we moved from our lower plant to our upper plant with the Knox tractor. We had 12,000 ft. of this lumber on the Knox, and two of our regular standard wagons loaded with 3500 ft. each hooked on behind. This load weighed approximately 26 tons, and it was quite remarkable to see the way the tractor handled this heavy load. After she hooked on she started right away without any hesitation at all, at an average speed of 7 or 8 miles an hour. It would have been possible to go 12 miles very easily, but as the loads on the wagons were very heavy, I didn't deem it advisable to run over 8 miles an hour. We are handling loads from 12 to 15 tons with the tractor with as much ease as a truck with a small load.

Clarke County, Washington, has purchased a 4-ton motor dump truck for use on roads.

Standard Oil Co. of New Jersey is apparently expecting to ship oil in larger quantities to foreign nations, as evidenced by the fact that it is building thirteen large tank steamers to cost $1,000,000. Other Standard Oil Companies are building thirty-six additional tankers.

Knox Tractor and Trailer Hauling a Big Load of Lumber

The CCJ has most readers because it gives most information

Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is a series of articles by this well-known writer, covering in a non-technical way, the various constructions now current practice in commercial car design. Preceding articles covered General Types of Chassis, Two and Four-Cycle Engines, Types of Cylinders and Their Parts, The Valve-Operating Mechanism and the Crankcase, Engine Lubrication, The Engine Cooling System, Carburetion and Carburetors, High-Tension Magnetos, Low-Tension Magnetos and Battery Systems, Inductor Magnetos, Governors and Speed-Controlling Devices Clutches, Unusual Features of Design, Transmissions, The Universal Joint and Differential, The Final Drive, Front and Four-Wheel Drives, Brakes, The Front Axle, The Steering Gear, The Frame, Power Plant Arrangement and Its Mounting, Springs and Suspension, Motor Truck Wheels, The Muffler.

PART XXIV

THE FUEL SUPPLY SYSTEM

THE function of the fuel supply system of a commercial car is to furnish the carburetor with an unfailing supply of gasoline until the supply carried is entirely exhausted. This must be done independently of the grades encountered by the vehicle. The gasoline is generally fed by gravity from the tank to the carburetor, although one maker uses pressure feed, while several others use the vacuum system, which has been so successful on pleasure vehicles.

In the gravity system the "head" of fuel is depended upon to feed it to the carburetor. Tank location therefore is an important phase of this system, and requires the tank to be elevated above the carburetor. With this system the tank may either be placed on the dashboard or under the driver's seat. In a pressure feed system the tank may be located at any level with reference to the carburetor, since the fuel is always under a predetermined pressure sufficient to maintain a constant level in the carburetor float chambers. This pressure may either be obtained from the exhaust or by a special air pump.

In the vacuum system the suction of the engine is used to draw gasoline from the supply tank to an auxiliary tank, from which the gasoline flows by gravity to the carburetor.

Gasoline Tanks

Gasoline tanks are generally made from tinned sheet steel, known as terne plate, and may either be pressed or formed to shape with ends and joints soldered or riveted and soldered. In order to provide the maximum mileage for a vehicle, they must be made to hold from 20 to 30 gallons and must be reinforced, so that the ends are protected from being forced out as the fuel rushes from one end to the other. These reinforcements or baffle plates also serve to prevent rattling due to vibration and sagging at the center of the tank. They are provided with holes or openings so that the gasoline can find a level in all compartments.

The filler cap and outlet are usually provided with strainers which are made from metal gauze, while shut-off cocks are provided in the outlet to shut off the supply. Some makers also provide a reserve supply in the tank. This is usually accomplished by a three-way cock fitted with a stand pipe which projects several inches

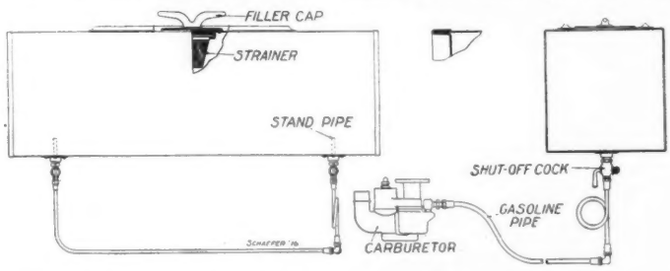


Fig. 1. Jeffery Quad Gasoline Tank and Gravity Feed System
Filler cap is located near the center of the tank and provided with a large handle, so that it can be easily removed

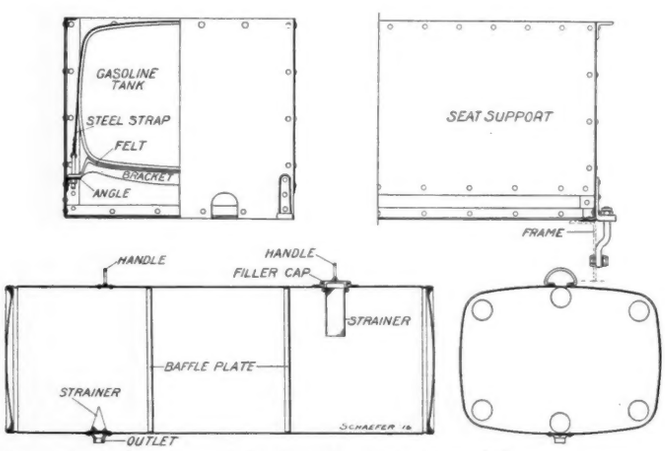


Fig. 2. Locomobile Gasoline Tank and Mounting
The tank is of the bolster or modified rectangular type and is provided with two baffle plates

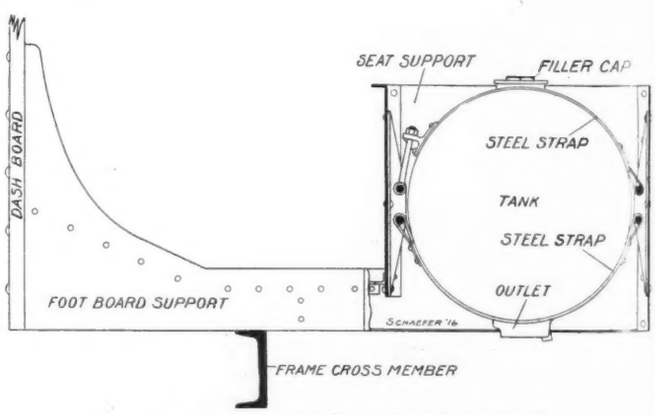


Fig. 3. Peerless Gasoline Tank Support
The tank is of cylindrical design, and is supported and retained by steel straps

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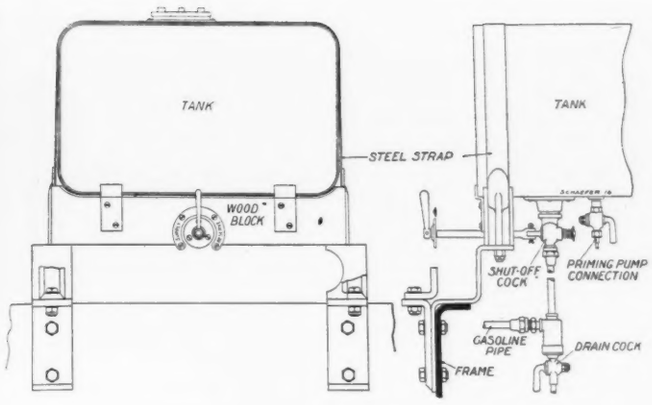


Fig. 4. Pierce-Arrow Gasoline Tank and Mounting
The framework is so constructed that it surrounds the tank. A reserve compartment is provided

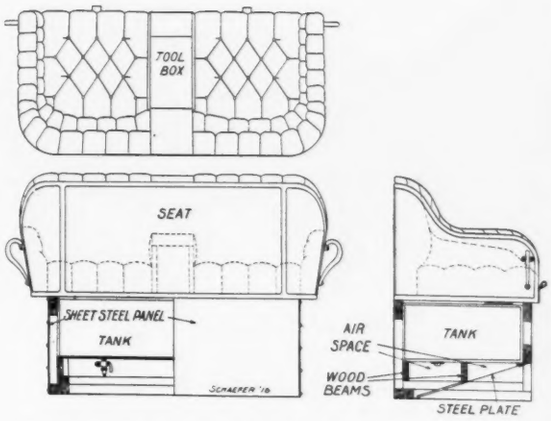


Fig. 5. Kelly-Springfield Gasoline Tank Mounting
It is retained by wood strips and protected from excessive heat by a steel plate at the bottom

above the bottom of the tank. Ordinarily the gasoline passes through this stand pipe, but when the lock is turned to the reverse position, the fuel is permitted to pass through another opening flush with the bottom of the tank. These features are shown in the following illustrations.

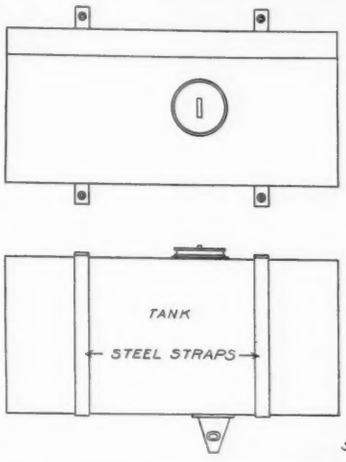
Jeffery Tank

Fig. 1 illustrates the Jeffery Quad gasoline tank and the feed pipe and carburetor. This also serves to illustrate the conventional gravity feed system. The filler cap is located near the center of the tank and provided with a large handle so that it can easily be removed. A large strainer fits inside of the filler flange, which is riveted and soldered to the tank. The body of the tank is of rectangular shape and formed from a sheet of steel. The head is set in, lapped and soldered as shown in the small sectional view. Two outlets with shut-off cocks are provided, so that gasoline may flow from either or both ends. Each of these cocks are provided with two openings level with the bottom of the tank for the reserve supply, while the regular supply is taken through the stand pipes.

Fig. 2 shows the Locomobile tank and mounting. This tank is of the bolster type, or modified rectangular shape and provided with two baffle plates for reinforcements. The heads are dished outward and the edges of the body are flanged over them and soldered. Both filler and outlet are provided with strainers, and two handles are soldered to the top of the tank so that it can easily be removed for repairs. The upper views show the method of mounting the tank in a steel compartment which supports the driver's seat. This compartment is made of sheet steel and a framework of small angles riveted together. Angles on the front and rear near the bottom support brackets which carry the tank. A strip of felt is placed between the brackets and the tank to form a cushion and steel straps hold the tank in position.

Peerless and Pierce-Arrow

Fig. 3 depicts the Peerless mounting. However, this differs from the above in that the tank, which is of cylindrical form, is supported and retained by steel straps. It is carried in a steel compartment supporting the driver's seat.



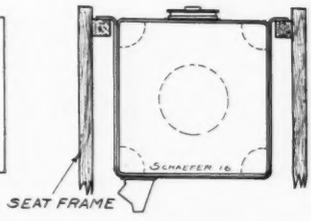


Fig. 6. Stewart Gasoline Tank and Mounting
This is mounted in a wood seat frame, steel straps being attached to the tank to form brackets

The Pierce tank is of rectangular shape and supported from the frame by means of sheet steel brackets and wood blocks, as shown in Fig. 4. This mounting is so constructed that the framework which supports the seat surrounds the tank. A reserve compartment is provided and arranged, accessible through a handle outside of the seat compartment. Gasoline feed to the carburetor is by gravity and a connection is also made for priming the engine in cold weather. A hand-operated priming pump is attached to the seat compartment and supplies a small quantity of gasoline to the motor through the intake manifold.

On the Kelly trucks the seat compartment is also made of wood and the rectangular-shaped gasoline tank fits snugly into this. It is supported by wood beams at each end and at the center. The tank is placed well above the carburetor to provide the proper head, as shown in Fig. 5. It is retained by wood strips and protected from excessive heat by a steel plate at the bottom, which provides an air space under the tanks.

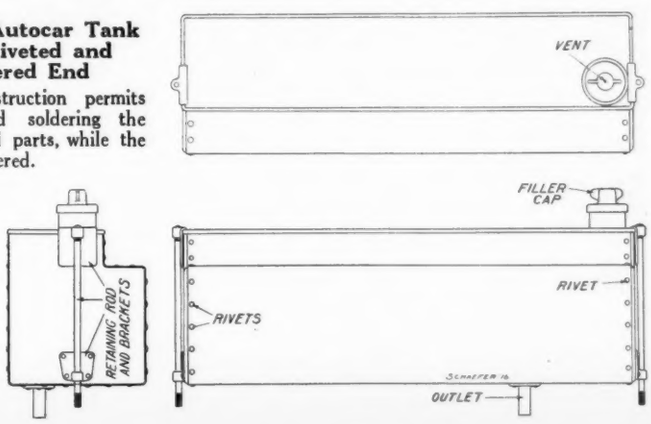
Stewart and Autocar

The Stewart tank, Fig. 6, is mounted in a wood seat frame. However, steel straps are attached to the tank and form brackets which rest on wood sills.

The Autocar tank, Fig. 7, is formed from a sheet but the ends do not lap, as a pressed cover is used. The heads are also pressed and set into the body. This construction permits riveting and soldering the head and all parts, while the cover which receives very little strain is soldered. This tank is mounted on steel brackets riveted to the frame and is retained by two rods which are supported by two brackets riveted and soldered to the tank.

Several makers use tanks which are drawn from one sheet of metal and have

Fig. 7. Autocar Tank With Riveted and Soldered End
This construction permits riveting and soldering the head and all parts, while the cover is soldered.



but one soldered joint. This type of tank is illustrated in Fig. 8, which illustrates the mounting of the United States trucks. These tanks are tinned inside and out and the head is soldered as shown.

The United States mounting consists of a separate frame or cradle, very rigid, having two brackets which rest on the vehicle frame, connected by a steel channel and a tie rod. Raybestos is riveted to the brackets to give a cushion effect, and the tank is retained by two steel straps. Gasoline feed is by gravity through a strainer attached to the tank and supported from the tank mounting.

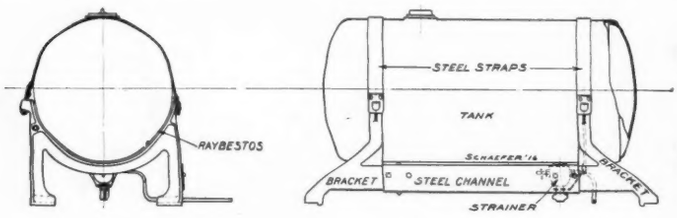


Fig. 8. U. S. Pressed-Steel Tank and Mounting
This tank is tinned inside and out, and the head is soldered.

In the pressure feed system either the pressure of the exhaust gases, or air pressure from a mechanical driven pump is used to force the gasoline to the carburetor float chamber. This system requires considerable piping, a pressure gage, a pressure regulator or pump and a hand pump.

Stewart Vacuum Feed

The Stewart vacuum feed is used on the Knox tractor and the Kissel Kar trucks and is shown in Fig. 9. The mechanism is contained in a cylindrical tank which may either be mounted on the engine or on the dashboard. The tank is divided into two chambers, the upper one being the filling chamber and the lower the emptying chamber. The former contains a float valve and the connections to the intake manifold and the main fuel tank. The lower chamber has a connection leading to the carburetor. This lower chamber is always under atmospheric pressure as the flow of gasoline from it is by gravity only. Atmospheric pressure is maintained by an air vent which communicates with the chamber. The suction of the piston on the intake stroke creates a vacuum in the upper chamber, which closes a valve between the two chambers and in turn draws gasoline from the main tank. The gasoline, as it is being sucked into the upper chamber operates a float valve. When this float valve has risen to a certain mark, it automatically shuts off the suction valve and opens an air valve. This open air valve creates an atmospheric condition in the upper chamber and gasoline immediately commences to flow to the emptying chamber. When the float is at the bottom of its chamber, the suction valve is open and the air valve is closed. The lower chamber has a flap valve which prevents the gasoline in the lower chamber from being sucked into the upper chamber, as the float falls and opens the suction valve.

On the Knox tractor the gasoline tank is mounted on the running board and the engine suction through the system described above draws gasoline from the main tank and supplies the carburetor.

Saurer Gasoline Feed System

The Saurer truck uses a pressure feed, the gasoline tank being located under the driver's seat and above the level of the carburetor when the tank is full. On the special Saurer carburetor, however, it was found that a constant pressure was essential to its proper functioning and while the gasoline tank was moved from the rear of the truck to the driver's seat, the pressure system was retained. Fig. 10 is a cross-section of the exhaust pressure device.

The exhaust gas enters and passes through a screen to remove carbon and fire, any small particles falling to the bottom of the long tube which can be removed for cleaning. The gas then passes to the other chamber through the valve which it lifts. The valve is returned to its seat by a spring to retain the pressure in this chamber and prevent its escape back into the exhaust manifold in the interval between exhausts. The upper valve is a sort of safety valve to prevent the pressure from becoming too great. This valve is regulated by the knurled screw on top of the device. The pressure is maintained at about 2 lbs.

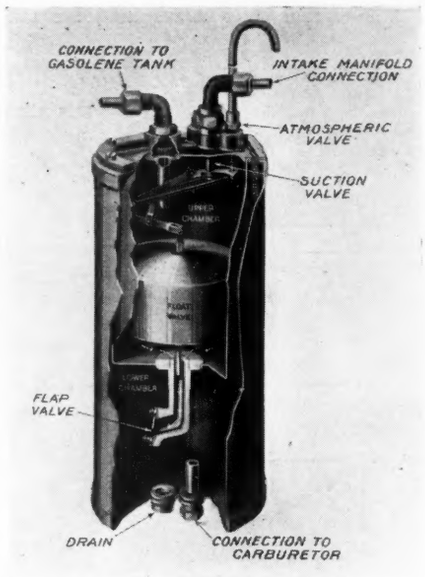


Fig. 9. Stewart Vacuum Tank
This shows very clearly the relation and operation of the different parts

Advantages and Disvantages

Each system has its advantages and its disadvantages. Gravity is an absolutely dependable and constant force which acts independently of any artificially created conditions, and can be implicitly relied upon to cause the flow of fuel to the carburetor so long as the pipe is unobstructed and the upper surface of the fuel supply is at a higher level than the gasoline level in the carburetor float chamber. It is the most simple system on account of the simplicity of piping and fittings and there is practically nothing to keep in order.

The chief disadvantage is that the pressure under which the fuel is supplied to the carburetor is variable. Not only does it diminish progressively as the fuel level in the tank falls, on account of the reduction of the gravity head acting, but it also diminishes whenever that portion of the vehicle which carries the tank stands at a lower level than that which supports the carburetor.

With a forced system, as long as the artificial pressure is maintained, there is almost a certainty that gasoline will constantly be fed to the carburetor entirely independent of every other condition.

The system possesses disadvantages in that there are numerus pipes and joints which must be kept tight in order that the tank may hold its pressure and the multiplicity of pipes and fittings adds to the possibility of leaks due to vibration.

The vacuum system is by far more simple than the forced system and eliminates the pressure pump, gages, regulator, a number of fittings and an air-tight tank. Leaks in pipes are materially reduced as the pressure is very low. Like the forced system it will supply gasoline to the carburetor regardless of grade, vehicle position or head of gasoline in the main tank.

This vacuum tank must not be installed on the exhaust side of the engine, as gasoline may leak or overflow from the tank and cause explosions or fires. Proper operation of the system depends entirely upon the float valve and if it develops a leak it cannot shut off the suction valve as it becomes too heavy to rise. Particles of dirt may also cause trouble by holding the flap valve open, which will render the system inoperative. The piping is also subject to the danger of vibration.

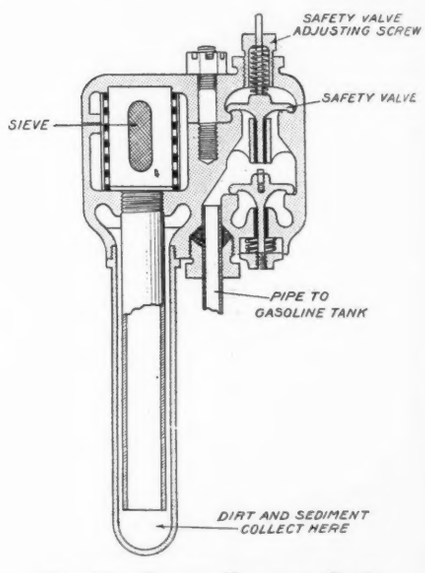


Fig. 10. Saurer Pressure Device
Exhaust is screened and enters through lower valve, upper valve being an adjustable safety valve to maintain a steady pressure.

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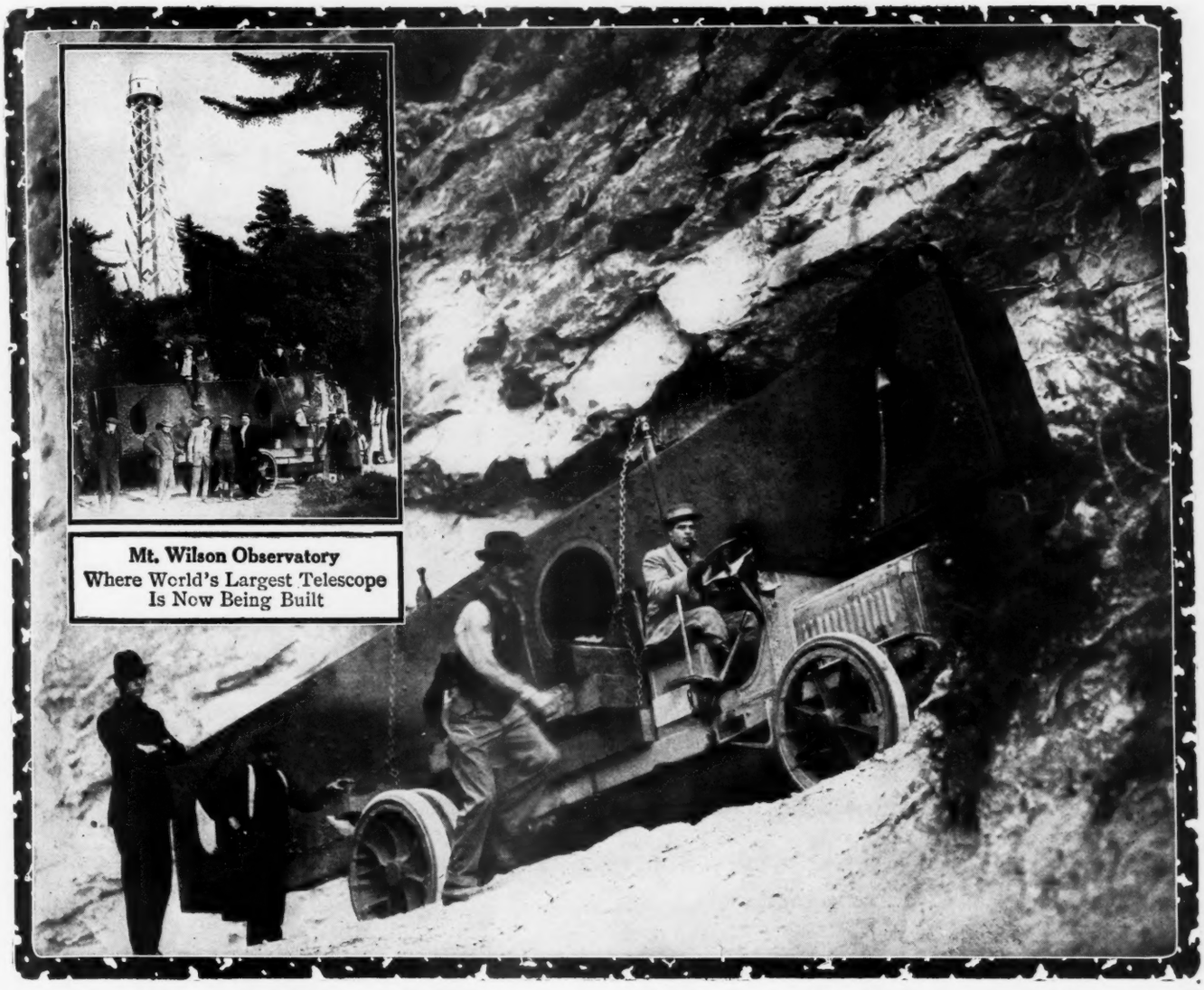

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Nine Miles of This—and Scarcely Scratched!

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Such a world-beating accomplishment required tires that could stand the strain of a nine-mile pull on a stiff, winding grade, carrying a 13-ton steel girder, over a grinding granite road.

The equipment was 37x5 tires on front wheels; 43x6 duals on rear—Firestone Hard Base Removable Tires. Firestone endurance was essential—and unfailing in the pinch. Skidding was a danger to be provided against—so the experts chose Firestones for the sure, steady hold.

Frequent stops and starts on sharp grades subjected the tires to strains—made worse by the tremendous overhang. Much of the time the entire weight, including girder and truck, of 16½ tons rested on the rear tires alone. Write for illustrated folder of this interesting event.

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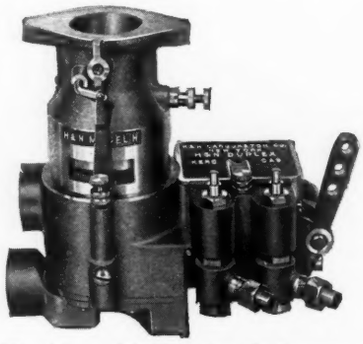
H. AND N. DUPLEX CARBURETOR

The H. and N. Carburetor Co., of 1790 Broadway, New York City, are now offering the new H. and N. Duplex Carburetor, designed to use gasoline for starting and kerosene for running after the engine has become warm and utilizing certain proportions of the exhaust gases to heat the kerosene after it has been metered. This carburetor has a dash pot air valve and a device for varying dash pot resistance. It is claimed starting is accomplished with ease, due to the high air velocity through the Venturi section. In the larger of the sectional views are arrows showing the passages for exhaust gases around the annular kerosene passage.

The uniformity of heat at different speeds is maintained by a simple pressure valve, which at low speed forces all of the exhaust gases through the passages of carburetor shown in sectional view, and which is set to gradually open as the pressure of the exhaust gases increases, thus eliminating back pressure. This pressure valve is located on exhaust pipe close to exhaust manifold and has the pipe to carburetor attached. Exhaust gases, after passing through carburetor, are returned by pipe to the exhaust pipe, and thus follow the usual course. Thus it will be seen that practically a constant heat is maintained in the carburetor.

The cold kerosene, after being metered by the action of incoming air to the exact requirements of the engine, is subjected to intense heat, at K, while in a thin film spread between two hot walls, spaced apart about the thickness of a piece of newspaper, and covering approximately 25 sq. in. of heating surface.



The H. and N. Duplex Carburetor

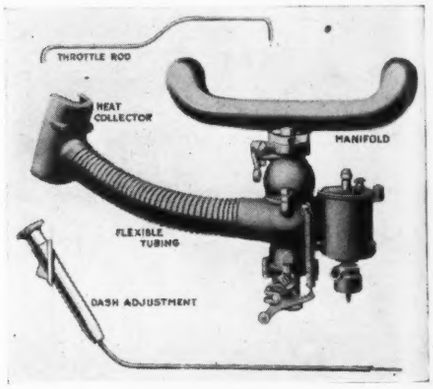
In this narrow space it is converted into a gas, and emerges from the multiple jets surrounding the choke tube, where it is picked up by the inrushing air, mixed and drawn into the cylinders.

Referring to the sectional view, F represents the compensating air valve, C being auxiliary air passage, and Q the air dash pot to regulate the opening of air valve. The working vacuum is regulated by valve B. At E is shown the connection for regulating the kerosene metering device shown at the left in small sectional view. The low speed air adjustment is controlled by G. The change from one fuel to another is controlled by lever O, which moves the fuel selecting plug N, shifting the openings to kerosene or gasoline passages as desired.

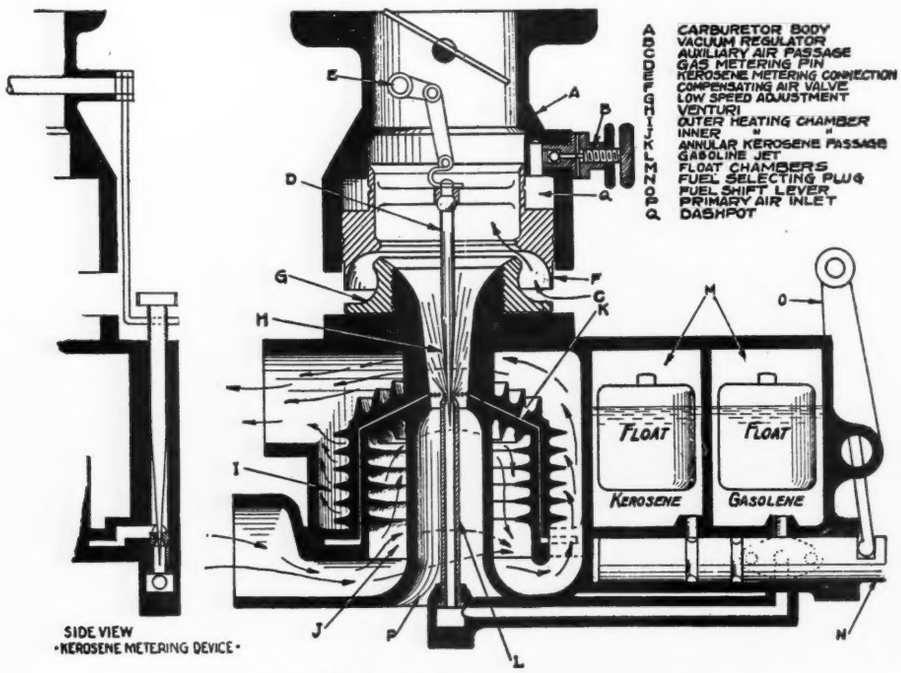
The prices of this H. and N. Duplex range from $35 for the 1 in. to $200 for the 3 in., f.o.b. New York. Flexible tubing and hot air stoves are supplied.

SPECIAL STEWART CARBURETOR FOR FORDS

This special outfit for Ford cars has been placed on the market by the Detroit Lubricator Co., of Detroit, Mich., to sell complete for $15, including the manifold dash adjustment. Hot-air connections and throttle rod are all provided. The action of this automatic carburetor is well known and was described in the January, 1916, issue, page 203. It has a dash pot to retard air valve action, an automatic metering valve for the air and a tapered metering pin, which is adjustable. The metering air valve is raised, by the suction of the engine, from its seat which it occupies when the engine is stationary. This automatic metering valve, as it rises, increases the size of the jet opening, and the farther it opens, the greater the jet of fuel becomes. Thus it will be seen the gasoline spray is regulated by the position of the automatic metering air valve, which is regulated by the suction of the engine. The only adjustment is that of the position of the tapered metering pin, which is to increase or decrease the jet opening for all speeds. The air supply is fixed.



Stewart Carburetor Outfit for Fords
Herewith is shown the outfit for Ford cars complete with manifold



Sectional View of H. and N. Carburetor
Herewith is shown a sectional view of carburetor, and also sectional side view of kerosene metering device

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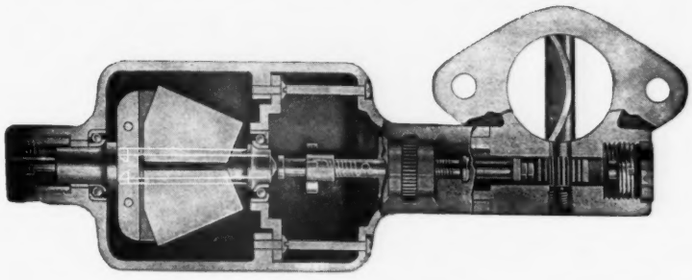
PIERCE

GOVERNOR

The Favorite of the Engine Builders



The Pierce Motor-Driven Governor here shown is the one that the leading engine builders place on their product to control the engine speed.

This Governor is operated direct from the engine, being attached to any exposed rotating part and is adjustable to any desired number of revolutions per minute.

Among the users and endorsers of this Governor are the makers of the Continental, Rutenber, Wisconsin, Waukesha and Herschell-Spillman motors.

There are two other Pierce Governors which control the vehicle speed and are used by hundreds of concerns who wish to prevent their trucks being racked to pieces by reckless drivers.

If one of these three Governors is not on your trucks you should lose no time in learning how advantageous other truck users have found them to be.

PIERCE GOVERNOR COMPANY

Anderson, Indiana, U. S. A.

Originators of Speed-Controlling Devices for Gasoline Cars

THE WORLD'S LARGEST GOVERNOR BUILDERS

STANDLEY ADJUSTABLE NON-SKID TRUCK CHAIN

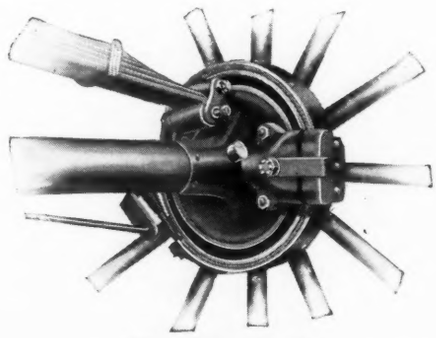
The Standley Skid Chain Co., Boone, Ia., is offering the Standley Adjustable Non-Skid Truck Chain. This is described as being a chain equipment made in sections of extra heavy material for the different makes of trucks according to their capacity. Hooks of heavy iron are placed across the felly of the wheel. The hook comes to the inside corner of the felly with a short tip on the outside. These hooks are set on the felly with ⅜ in. lag screws. The cross chains of heavy German twist style are fastened loosely into these hooks on one end. The cross chain passes around the tire, and on the outside of the wheel is strung on a steel ring which runs circumferentially around the wheel. This ring is made of ½ in. and ⅝ in. material and is connected together with a strong turnbuckle. The chains are said to be made to fit each wheel to the finest measurements, so that they may have the finest adjustment when loose or tight. The material used in making these chains varies in accordance to the capacity of the truck and the nature of the work it is doing. It is further claimed to be impossible for the chain to come off after being placed on the wheel. The Standley Truck Chain is listed in 5 sizes from $15 to $22.

Standley Adjustable Truck Chain

This illustration shows the method of attaching the chain to the truck wheel. The steel ring with turnbuckle adjustment is clearly seen.

THE MASTER BRAKE FOR FORD CARS

Saving expense in rear end trouble as well as increased safety for the car and driver, are the chief purposes said to be achieved by the Master brake for Ford cars. This brake is of the external contracting type, having a special 10 in. drum with 1½ in. face and giving 90 sq. in. of braking surface. It is bolted firmly to the rear wheels, six lugs are cast on the drum and these straddle six spokes in addition to the regular hub bolt fastenings, and this construction adds 50 per cent. or more to the strength of the rear wheels. The brake for operation is connected to the foot pedal, which is the one used 90 per cent. of the time, and can also be attached to the emergency lever if desired. It is so designated that it may be quickly attached. The brake bands are of mild steel and other materials employed are malleable castings, chilled iron drums and a high grade brass wire woven asbestos lining, not affected by heat or oil. By applying a braking pressure on the rear drum instead of the transmission, the Master brake eliminates chattering and strain on the rear system. It is claimed to be perfectly equalized and to prevent skidding, and therefore to add materially to the life of tires as well as preventing broken rear axles, drive shafts and pinions, important economy features, as well as the element of safety, which is becoming so important as traffic densities and driving speeds increase. The brake has been sold in Los Angeles, where it is manufactured, during the past year and a half to many drivers of jitney buses, and to operators of Ford cars in delivery service including practically all the largest firms operating Ford fleets, and is in the same classes of service in other cities where agencies have been placed. It is manufactured and sold through the trade by Master Equipment Co., 2200 South Main Street, Los Angeles, Cal.



The Master Brake

This shows the heavy car type of Master Brake for Ford cars, price $18.50 with foot pedal connections. The light car type sells for $9 with emergency brake lever attachment, and $12.50 with foot pedal attachment.

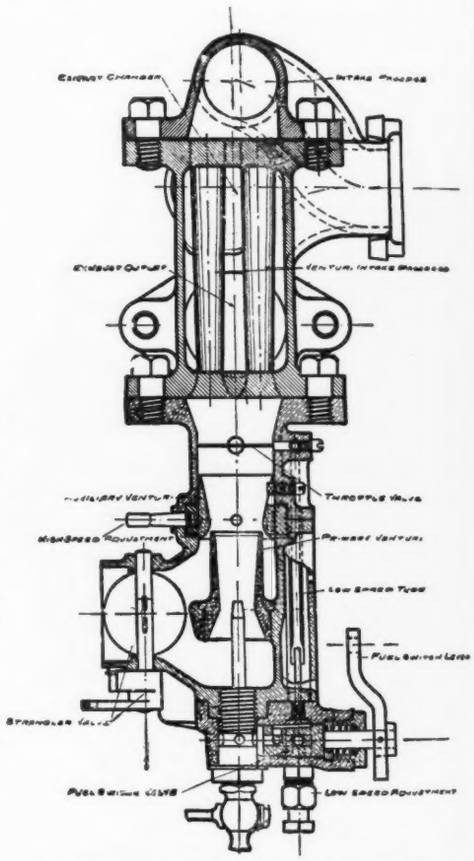
THE WESTERN KEROSENE-GASOLINE CARBURETOR

The Western Motor Appliance Co., of Charles City, Iowa, has recently marketed the Western Kerosene-Gasoline Carburetor, which is of two-bowl type, using gasoline for starting only, and which utilizes a one-piece manifold for assisting complete vaporization of the mixture.

This carburetor was designed for use with any heavy grade fuel, and the maker claims it solves the problem of the use of cheap gasoline, or of kerosene.

It takes the fuel, thoroughly mixes it with air and then converts this mixture, which is in the form of a vapor or spray, into a dry explosive gas. As fuel is drawn from the nozzle by the suction of the engine, it is entirely surrounded by a fixed or constant air stream, which is regulated by a Venturi tube so set that the highest velocity of air is obtained just at the nozzle point. Surrounding this primary Venturi tube is another fixed passage for auxiliary air. Above the primary Venturi tube, which regulates the auxiliary air, and which is controlled from the dash. This regulates the suction upon the primary Venturi and fuel nozzle.

The mixture from the primary Venturi and the auxiliary air travel in the same direction, the air surrounding the mixture like a jacket, keeping the mixture from direct contact with the walls of the carburetor passage. This auxiliary air and the mixture are claimed to be thoroughly mixed in passing through the multiplicity of Venturi passages in the manifold. As it passes through the passages, which are heated by the exhaust gases from the engine, it is converted into a highly explosive gas.



Sectional View of the Western Kerosene-Gasoline Carburetor

This sectional view shows carburetor with manifold attached. This carburetor is of two-bowl type.

The Western Carburetor is provided with two low speed adjustments, one for kerosene, the other for gasoline. These adjustments are independent of each other and remain adjusted when once set, and are said to operate perfectly and in conjunction with the main fuel nozzle. The outfit for Ford cars sells for $25.

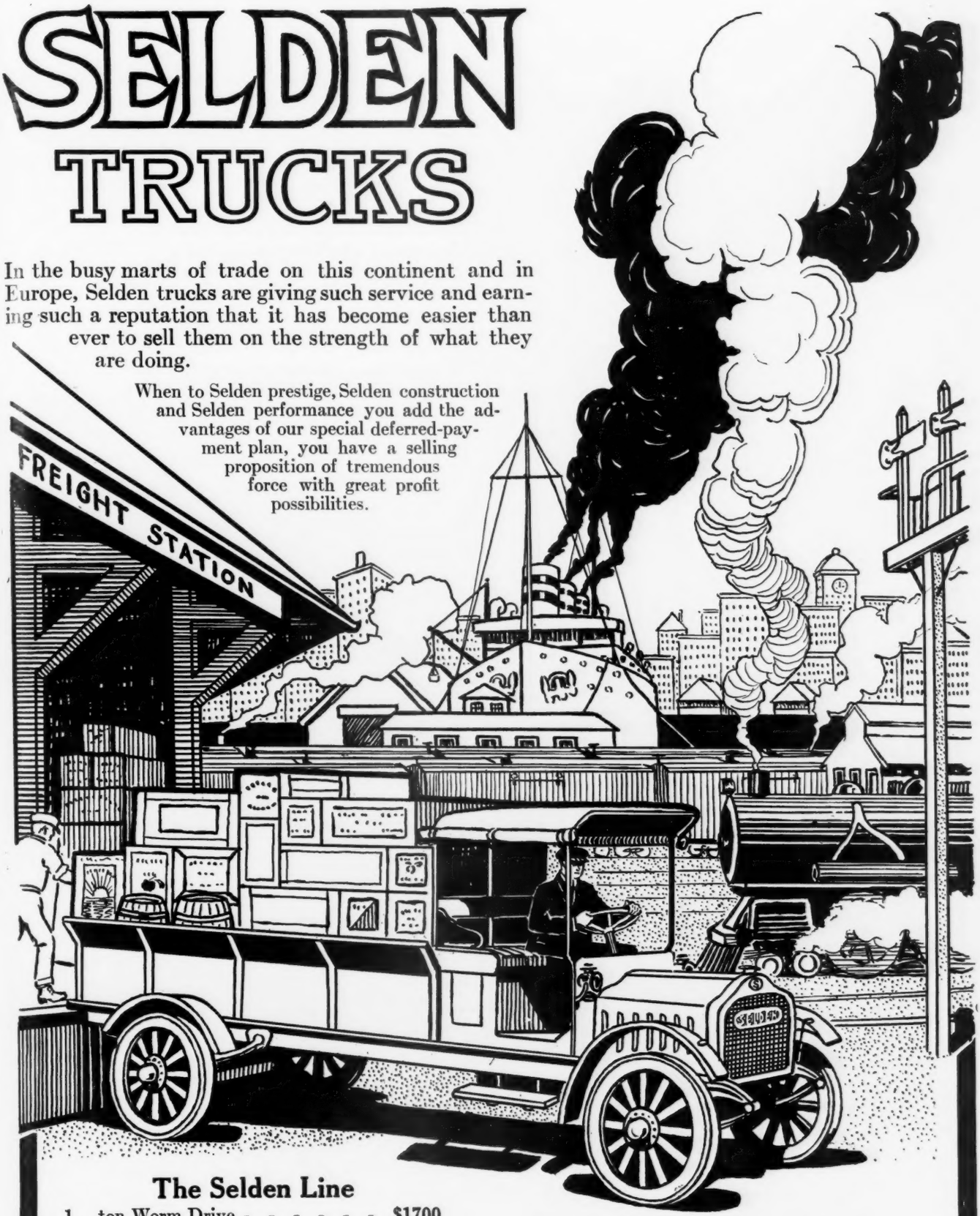
According to a report of the United States Department of Agriculture, it is estimated that American farmers lose $250,000,000 annually on account of the inaccessibility of their products at certain times of the year. This loss, due to bad road conditions, is about equal the amount spent last year in road improvement work.

The CCJ has most readers because it gives most information

SELDEN TRUCKS

In the busy marts of trade on this continent and in Europe, Selden trucks are giving such service and earning such a reputation that it has become easier than ever to sell them on the strength of what they are doing.

When to Selden prestige, Selden construction and Selden performance you add the advantages of our special deferred-payment plan, you have a selling proposition of tremendous force with great profit possibilities.



The Selden Line

1	ton Worm Drive - - - - - - -	$1700
2	" Worm Drive - - - - - - -	2250
2	" Internal Gear Drive - - -	2000
3½	" Worm Drive - - - - - - -	2950

Write for our sales plan—it may mean much to you

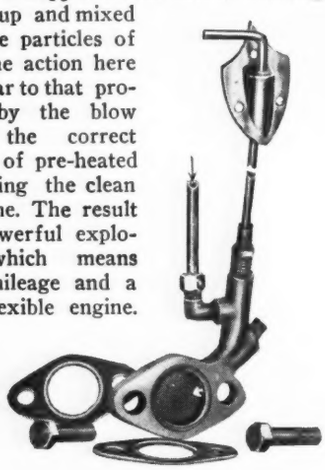
Selden Truck Sales Company, Rochester, New York

THE ALBRECHT GASOLINE SAVER

The Albrecht-Ingraham Co., of 303 South Third Street, Minneapolis, Minn., has brought out the Albrecht Gasoline Saver, a device using the principle of the air blast on a gasoline blow torch.

It is a device, substantially made of aluminum, copper and brass, which is placed between the carburetor and the intake manifold of any gasoline engine. It draws a blast of clean, hot air from around the exhaust through a copper coil, the action of which is to greatly expand the small particles of gasoline vapor just after it leaves the carburetor.

The expanded vapor is then drawn through a copper screen and is thoroughly broken up and mixed with fine particles of air. The action here is similar to that produced by the blow torch, the correct amount of pre-heated air giving the clean hot flame. The result is a powerful explosion, which means more mileage and a more flexible engine.



Albrecht Gasoline Saver

This device is made in sizes for all cars and is designed to furnish clean hot air at intake manifold

As the blow-torch flame prevents soot, the Albrecht gasoline saver is said to prevent carbon.

The screen is said to absolutely prevent car from catching fire from back-firing of the engine.

The device is operated by a dash control which is finished in nickel. The air blast is turned on as soon as the engine becomes warm, after which it requires no attention. Ford size, $3.50, complete, ready to install. Installation requires no special tools, and as there is no machine work, can be done by anyone in 30 minutes.

Can be had for any other make of car for $5.

TYPE H STERLING SIREN FIRE HORN

The Interstate Machine Co., of Rochester, N. Y., offer the Sterling Siren Fire Horns, both electric and hand operated, for use on motor fire truck. The type "H" siren is hand operated and long distance type. It can be had with brass or nickel finish at $35.

Sterling Siren Fire Horn

This horn is designed to meet the demand for a powerful and reliable warning signal for motor fire trucks.

The horn fan or rotor is 7 in. in diameter and is operated by a chain of case-hardened steel gears, running on steel balls. All operating mechanism is entirely enclosed parts running in grease. The operating handle can be revolved continuously, or can be oscillated by means of a simple friction clutch. A thumb brake is provided to stop the rotor instantly.

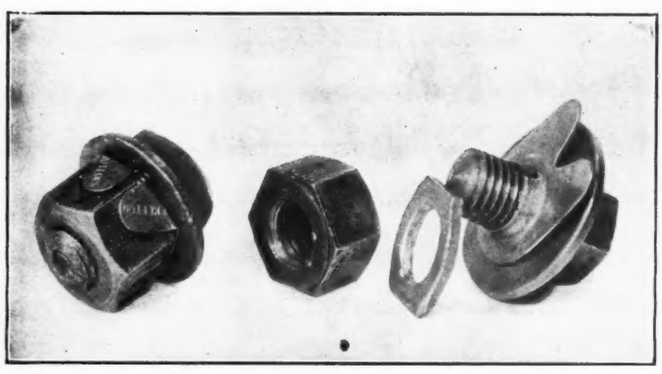
The Sterling Electric Siren Fire Horn sells for $35 also, and can be had in either brass or nickel finish. It is designed for use where there is but one occupant of the car, or where the hand operated model is not convenient.

THE SHEKLETON NUT LOCK

The Shekleton Safety Nut Lock is a new type of nut lock recently introduced into this country, which differs materially from the various types in common use. The lock consists of two parts. One is a soft metal lock washer, about 1-32 in. thick, which is turned up around the bolt in the form of a slightly tapered collar about 3-16 in. high. The other piece, known as the compression washer, is a flat washer, ⅛ in. thick with a hole tapered slightly to fit over the tapered collar of the lock washer.

In use the lock washer is placed over the bolt first with the collar up, followed by the compression washer and then by the nut. As the nut is screwed down the compression washer is pressed over the lock washer, forcing the cone of the latter to bind around and between the bolt threads. The cone takes a plane or horizontal grip across the pitch of the bolt threads, rather than in register with them, and thus forms an obstruction to turning, except with a tool wrench.

After the nut is screwed fast it is secured against turning by bending the two projecting split tails on the end of the lock washer up against the sides of the nut. To release the nut these tails are bent back and the nut is turned off the bolt. The wrench is then applied to the compression washer, two flat sides being provided for this purpose. By forcing one completed turn the soft metal in the cone of the lock washer will conform to the pitch of the bolt threads without damaging the bolt. This nut is made by the Stanley Works, of New York City, and New Britain, Conn.

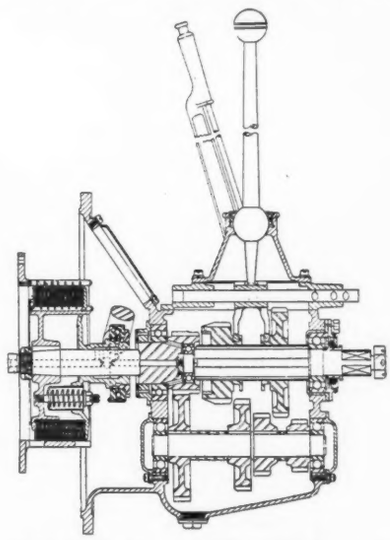


Nut Lock Assembled and Disassembled

On the left is shown the nut lock assembled, the individual parts being shown at the right

TWO NEW WARNER GEARSETS FOR MEDIUM-CAPACITY TRUCKS

Two new gear sets designed to be used in unit power plant construction have recently been offered by Warner Gear Co., of Muncie, Ind. These are known as Model T-32 and Model 57, the former being three-speed, center control type, and for 1 to 2-ton trucks, and the latter being the same except that it is designed for 2 to 3-ton trucks. The Warner Co. also announces the discontinuation of the design of transmission formerly known as Model 57.



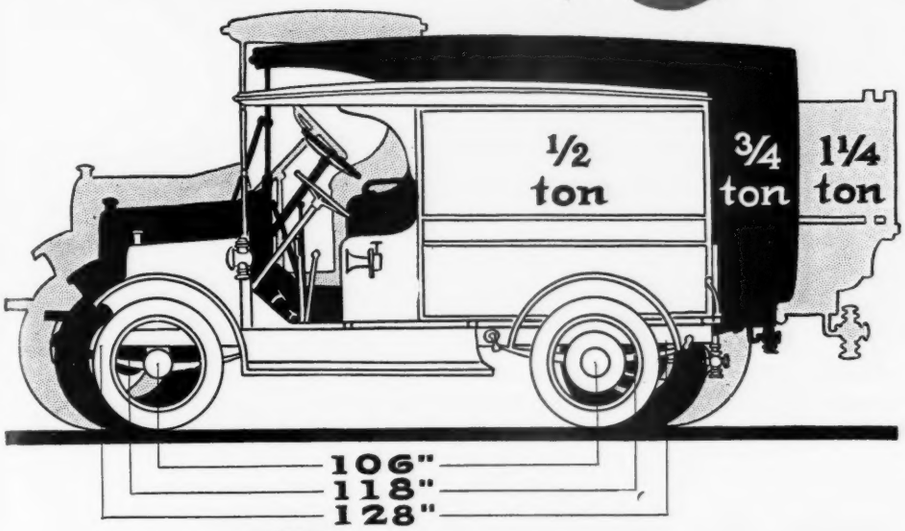
Sectional View of Warner Gearset

This illustration shows the construction of this new Model T-32 transmission of Warner make. This model is for one to two-ton trucks.

These two new models have gearshift lever pivoted with ball and socket and mounted on top of transmission box. The brake lever is mounted on the right side of transmission box. Transmission shafts run on ball bearings and transmission boxes have drain plug in base. Ball thrust bearings are used in the clutch release mechanism, the clutches being of the multiple disc type. Model T-32 has gear reductions of 3.33:1 on first, 1.64:1 on second, 1:1 on third (direct drive), and 4.35:1 on reverse. Model 57 has gear reduction of 3:1 on first, 1.72:1 on second, and 1:1 on third (direct drive), reverse being 4.15:1.

The CCJ has most advertisers because it gives them biggest returns

QUALITY TRUCKS AT QUANTITY PRICES



Three models, whose capacities meet 85% of all delivery requirements, comprise the fast selling line of

Stewart Delivery Trucks

These three models, roughly shown above, are of the capacities that are most in demand, that are the easiest to sell and are most successful in providing economical solutions for delivery problems.

The 1000 pound car is a wonderful success, and a value that stands unchallenged at $750. Its utility is almost universal and it virtually sells itself.

The 2500 pound truck covers a big field and is a great seller, because it gives 500 pounds greater capacity for less money than the average ton truck. Price only $1390.

The 1500 pound truck most acceptably serves those whose requirements come between these two capacities. It sells at $1290.

Get the Stewart agency and you are on the road to success. Right capacity, right construction, right price and live selling methods will enable you to build up a mighty profitable business.

Write us about it

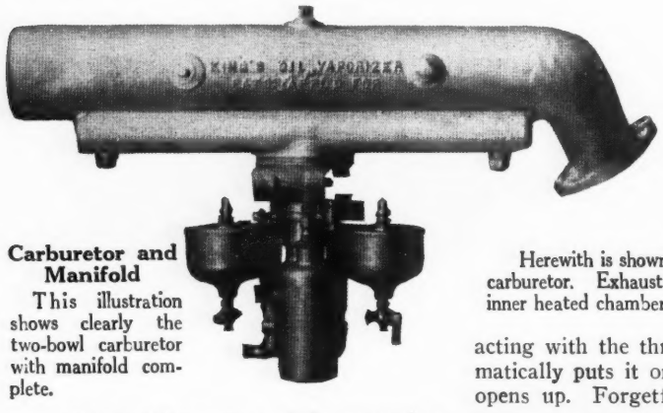
Stewart Motor Corporation, Buffalo, N. Y.

When Writing, Please Say—"Saw Your Ad. in the CCJ"

THE KEROSENE-BURNING CARBURETOR, A TWO-BOWL TYPE, UTILIZING VAPORIZING MANIFOLD

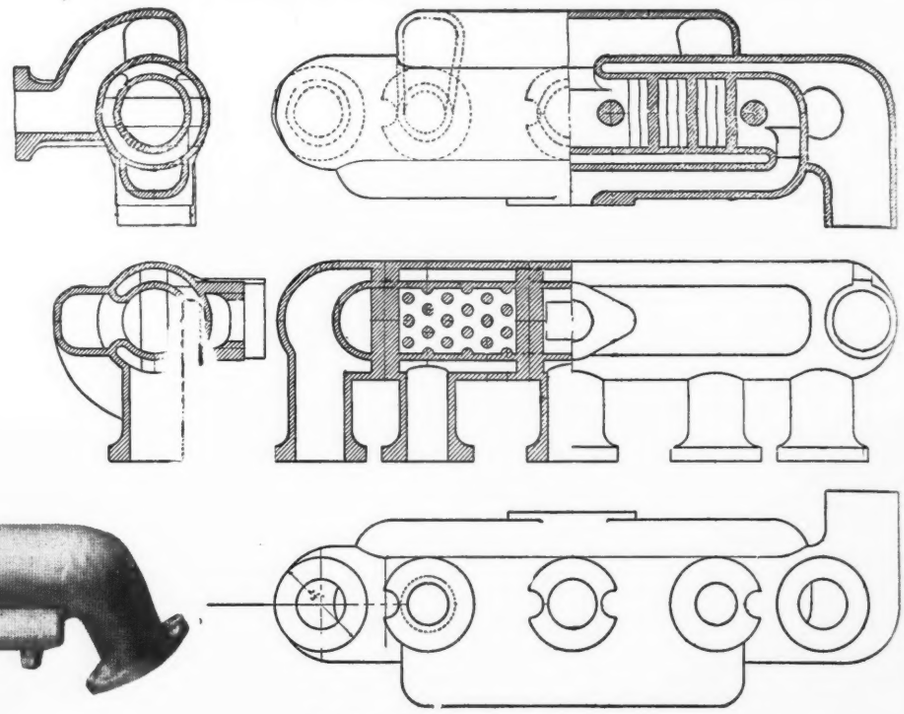
The Kerosene Burning Carburetor Co., of 707 Woodward Avenue, Detroit, Mich., has developed a carburetor designed to use kerosene as a fuel and gasoline for starting and a combination manifold to be used in conjunction with the carburetor, which is termed a vaporizer. The main function of the vaporizer is to distribute heat evenly throughout the mixture within certain limits of temperature, which it does by actual impingement of the fuel vapor upon suitably arranged heated metal to attentuate it to the proper degree. In the sectional view the staggered rods are shown in the inlet passage. The carburetor is two-bowl type with desirable points of the up-to-date instrument, and having such improvements as are essential for the usage of kerosene as a fuel. This fuel is said to require 40 per cent. more air for its preferred process of combustion than does gasoline, and is said not to permit such great departures from the ideal mixture as does the latter, without showing in color of the exhaust. The maker claims to have perfected this carburetor so that it preserves the same fuel proportions at all working speeds of the engine by several new features. There is only one point of adjustment for fuel proportioning—the needle valve—and this is said to be a great advantage to the average driver.

The carburetor is designed to start the engine with a gasoline mixture to warm up the vaporizer, which takes from one to two minutes. Both gasoline and kerosene are constantly ready for the spray nozzle, and are admitted as desired by a fuel valve co-acting with the throttle valve, which automatically puts it on kerosene as the driver opens up. Forgetfulness cannot allow the car to be run on gasoline after it is warmed up because of an automatic feature. The system permits idling on either fuel.



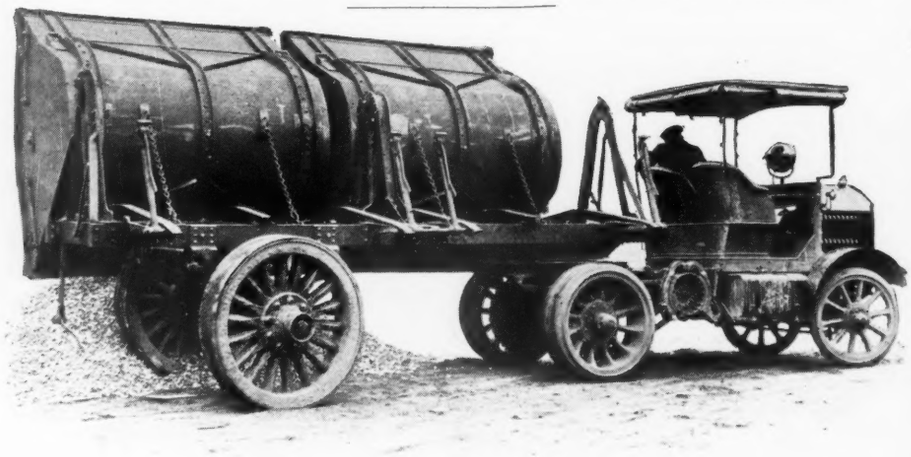
Carburetor and Manifold

This illustration shows clearly the two-bowl carburetor with manifold complete.



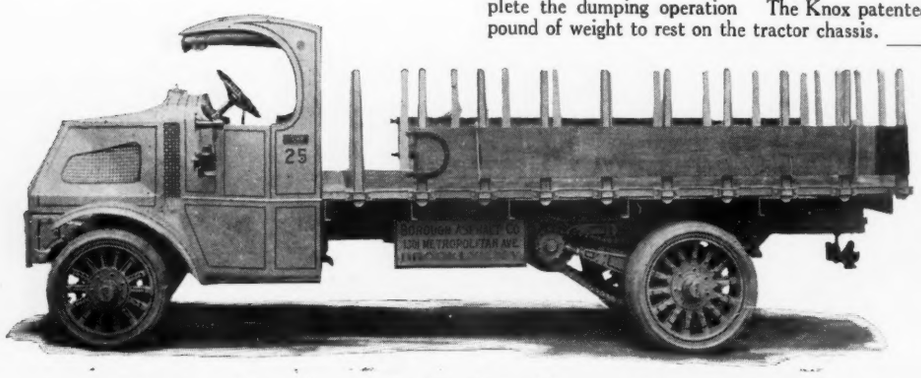
Sectional Views of Manifold

Herewith is shown several sectional views of manifold or vaporizer employed in combination with the carburetor. Exhaust gas passes through large outside chambers and incoming mixture passes through inner heated chamber.



Knox Tractor and Side-Dumping Semi-Trailer

Herewith is shown an interesting type of side-dumping semi-trailer made by the Lee Loader Company, of Chicago, for use in connection with the latest types of Knox Tractor. It will be noted that the two-way, two-compartment body is well adapted to the handling of sand, crushed rock, etc. To dump either compartment it is only necessary for the driver to unlock the body and exert a slight pull on the dumping lever. The body is by this means rolled sufficiently to one side to allow gravitation to complete the dumping operation The Knox patented double spring suspension makes it impossible for a pound of weight to rest on the tractor chassis.



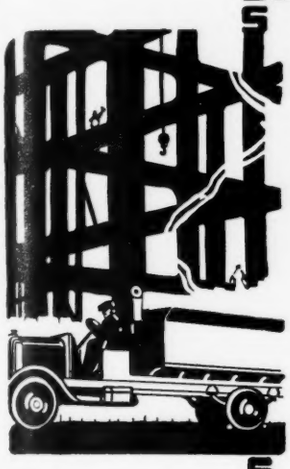
Mack Five and a Half Ton AC Truck

This illustrates the Mack five and a half ton AC truck, which greatly resembles the three and a half ton model described in the April 15, 1916, issue of this magazine, pages 28–30. Made in three wheelbases, 156, 168 and 180 in.; and as tractor, with 9 ft. 11 in. wheelbase. Tires are 36 x 6 in. single, front, and 40 x 6 dual, solid or block rear. Made by the International Motor Company, New York City. Price, $4000, f.o.b. Allentown, Pa.

The CCJ leads in circulation, advertising and prestige

A Truck for any Business

SIGNAL



With each of the five worm-drive models furnished in two and three lengths of wheel-base and the load capacity ranging from one to five tons inclusive, you can supply the traffic requirements of nearly any bulk or weight of load. This gives you a bigger sales opportunity—bigger sales volume and bigger profits in handling the Signal line.

Surely you realize the sales value of a line of worm-drive trucks from one to five tons. Especially when they are made of the finest materials and sold at the right price.

You know and your customers know the service value of Timken Axles and Bearings —Continental Motors—Brown-Lipe Transmissions—Detroit Springs—in fact, of every part that enters into the construction of Signal Motor Trucks.

This is a big year for motor truck dealers —get the most out of it with the "Line of least resistance"—the Signal.

Signal Motor Truck Co.

Detroit - Michigan

When Writing, Please Say—"Saw Your Ad. in the CCJ"

BUFFALO DEALERS SOLVE THE USED-CAR PROBLEM

By GEORGE W. GRUPP

USED automobiles and motor trucks have been a big problem to the Buffalo dealers. Much thought and hard words have been expended on the disposal of these vehicles. This is, however, not an exclusive dealer's problem, but it is also an owner's problem.

It has been suggested by a number of the dealers that in the future the owner of an old machine who wishes to buy a new one and wants the dealer to take his used machine in part payment should be obliged to first find a buyer for his car or truck. They claim that an association will do the trick. The selling price of the machine is then credited toward the purchase of a new vehicle.

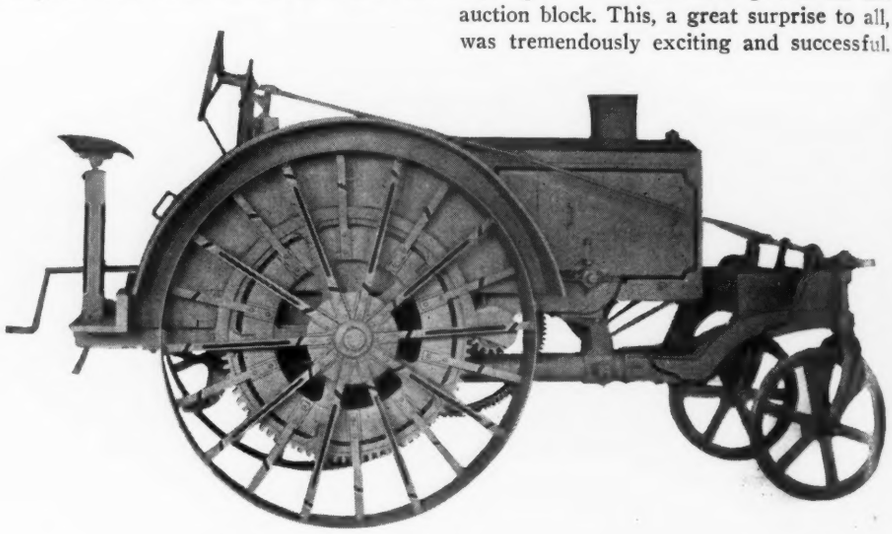
Should the owner request the dealer to sell it for him, the dealer should do so on a 10 per cent. commission basis only. In addition to this, the new machine should not be delivered until the old one has been sold. When sold the buyer is then credited with 90 per cent. of the selling price toward his new purchase.

The dealers who suggested this plan believe that it ought to be extremely beneficial to the trade. They say that a private owner can always get a better price for a used machine than they can. If the private owner puts an advertisement in the newspapers, these dealers maintain, prospective buyers are more inclined to call and see the machine. Besides, the seller can offer all kinds of excuses for selling which a dealer would not dare to mention. With every owner a salesman, the chances of selling used cars or trucks will be increased several hundred per cent.

Hold Auction Sale

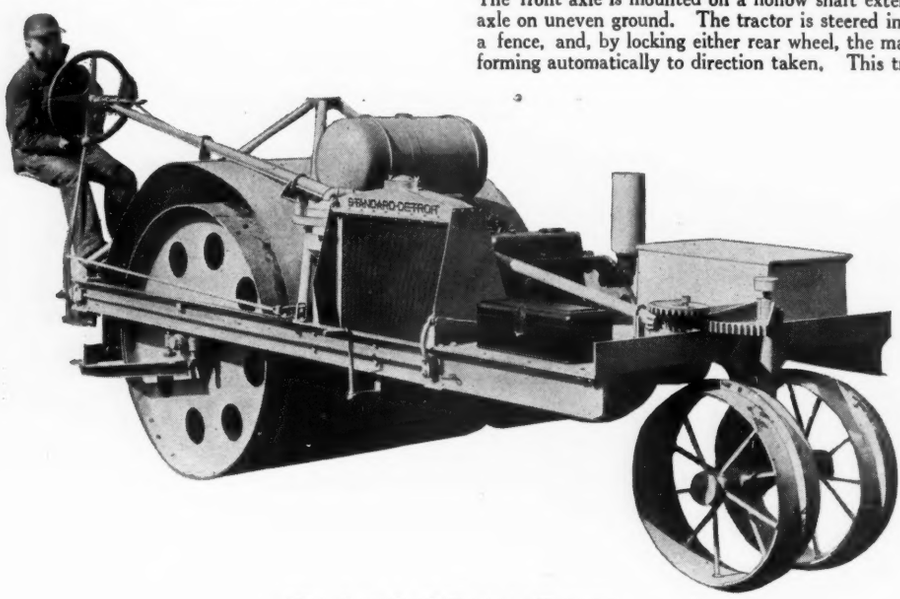
But the above plan is not the only thing that Buffalonians are thinking about or doing. The first effort ever made to solve both owners' and dealers' difficulties, jointly, was the staging of a mammoth second-hand automobile and motor truck show, which was held during the week ending April 22, in Buffalo's big Broadway Auditorium. It was reported that the show was a success from start to finish. This was largely due to the sales staff of the Spears Motor Sales Co., of Buffalo, who engineered the entire show.

Anyone who had a truck or auto to sell was given the privilege to exhibit same upon paying an entry fee of five dollars per car. The Spears Motor Sales Co. would then undertake the selling of same. For this service they charged a commission of ten per cent. of the price set on the machine by its owners when entered, not for which it was sold. Every evening each machine was placed on the auction block. This, a great surprise to all, was tremendously exciting and successful.



Maytag Gasoline and Kerosene Tractor

This tractor is made by the Maytag Company, of Newton, Iowa. It has a four-cylinder engine, 4¼ x 5¾ in., Waukesha make. The frame is a one-piece semi-steel casting, extra heavy and strong. Bull gear and pinions are large. When teeth are worn the toothed rings of these gears only are replaced. Rear wheels are 5 ft 6 in. x 10 in. wide, with removable cleats. Front wheels have swivel castor forks. The front axle is mounted on a hollow shaft extending to rear of tractor, which allows rocking of front axle on uneven ground. The tractor is steered in the usual way and in addition may be driven close to a fence, and, by locking either rear wheel, the machine turns sharp about, the front castor wheels conforming automatically to direction taken. This tractor is a three-plow type.



The Standard-Detroit Tractor

A new tractor constructed of standard parts which is being placed on the market by the Standard-Detroit Tractor Company, Detroit, Mich. It is built largely along automobile lines, weighs 3900 lbs., has drawbar pull of 2000 lbs., and sells for $1065. The radiator is unusually large and is of cast tank type. Engine is valve-in-head type, 10–20 h. p., enclosed moving parts, and engine, clutch and transmission are in a unit, all oiled from the engine. Three controls are used and the speed is 2½–3 m.p.h. The president of the company is M. L. Pulcher, vice president and general manager of the Federal Motor Truck Company, while Thomas E. Reeder, president of the Federal Motor Truck Company, is a director. Another director is A. R. Demory, vice president of the Timken Roller Bearing Company; Charles F. Mellish is vice president of the Tractor Company; Frank G. Jacobs, secretary; L. W. Goodenough, treasurer; and E. P. Hammond, president of the Gemmer Manufacturing Company, is a director. The factory is located at 1506 West Fort Street and is being operated to capacity to supply the demand for the tractors.

No admission was charged. To attract crowds cabaret shows and band concerts were held each evening before the auctioning began.

No vehicle was permitted to leave the building before it was entirely paid for in cold cash. Checks were refused, except in cases where the managers of the show had sufficient time in which to have the check cashed before the machine was taken from the auditorium.

Auto and truck dealers, as exhibitors, were dealt with differently. Dealers were given the privilege of doing their own selling. For this privilege, to exhibit and do their own selling, a rental of $43.20 for 144 square feet of floor space was charged. His machines were not placed on the auction block. He assumed the entire responsibility of disposing of the machine. If, however, the dealer did not choose to rent 144 square feet, then a rental of $10 per car or truck was charged.

Packet Motor Car Co., Minneapolis, Minn., has announced its officers as follows: William F. Tobin, president; George M. Davis, vice-president and sales manager; Frank R. Brasie, secretary-treasurer. E. F. Hopkins and John Brasie are directors. The company is looking around in St. Paul for a site upon which to build a factory.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

The Mark of Bearing Quality

Quality is superiority.

Quality explains dependability and, therefore, is of vital importance in bearings that carry great motor truck loads.

The work that Hyatt Roller Bearings are actually doing in thousands of motor trucks today is the most practical demonstration of bearing dependability.

This mark, therefore — the mark of the Hyatt Roller Bearing — is the sign of bearing quality.

HYATT

Make sure that your motor truck has Hyatt Roller Bearings.

SUBSTITUTES FOR GASOLINE IN GREAT BRITAIN

At the present time he would be a very bold man who would undertake to foretell the future of the fuel proposition in Europe. There is certainly a very strong feeling against the gasoline supply companies, but there is no denying that they are playing their game with great skill. Should a substitute for gasoline be discovered, which was workable, but not quite as good, it would undoubtedly have to compete with gasoline at a price dropped to meet circumstances; but on the other hand, there is such a wide spread feeling that Great Britain should not be dependent on a fuel coming from outside the British Empire, that even such a substitute might obtain some measure of Government support, though what form that support would take is not easy to foretell.

Probably the Government would try to improve it by development, but this matter of fuel within the British Empire may have quite an important bearing on the fuel question over here.

There seems a very general opinion that more might be done with alcohol as a fuel, though few realize the conditions under which it would have to be produced to be an economic success. It is certain that it cannot be made profitably in Great Britain, because firstly the climate would not lend itself to sufficient output, and secondly such output as was obtainable would be too heavily handicapped by the cost of land. It has been tried in Germany and failed. In this case the Government wanted for military purposes to encourage the population on certain waste tracts of land, and for this purpose offered a subsidy for potato growing on that land for alcohol. The scheme, however, could not stand by itself, and as soon as the subsidy was withdrawn it collapsed. In countries, however, where conditions enable two or three crops, like maize, to be produced within the year, and land costs practically nothing, the conditions are very hopeful, the more so in that the waste products from the distilleries are most admirably adapted to the enrichment of the land for producing crops for alcohol.

Apart from mineral oils there is another possible source of power. As long ago as the great Paris Exposition, there was a small Diesel engine quietly at work, but the fact that it was working on vegetable oil was unknown to most. It was running on an oil produced from the arachis nut, found in the North African territories of France, and on this the engine seemed to run admirably.

Though it is not immediately possible in the near future, it is not improbable that in the course of time we may depend for our power on an annual harvest.

BERLIN AUTO 'BUSES

The recently issued report for 1915 of the Berlin General Omnibus Co. is not encouraging. The company's income, which in 1913 was $3,325,000, in the following year fell to $2,920,000, and in 1915 was only $1,560,000. The report explains that when the war broke out most of the motor omnibuses were requisitioned for the army, and that it has been found impossible to replace them. Of the 21 lines on which 'buses ran in 1913, 17 were discontinued before the end of 1914, while at the close of 1915 there was only one motor 'bus line left in all Berlin. The company has tried to keep things moving by employing the old horse 'buses, but after experience with the autos, they have been unable to encourage much traffic like this, especially when time has been an object. By the close of 1915 there were 19 lines of horse 'buses running with 284 'buses in all, the whole result of the working for the year showing a deficit of $195,000.

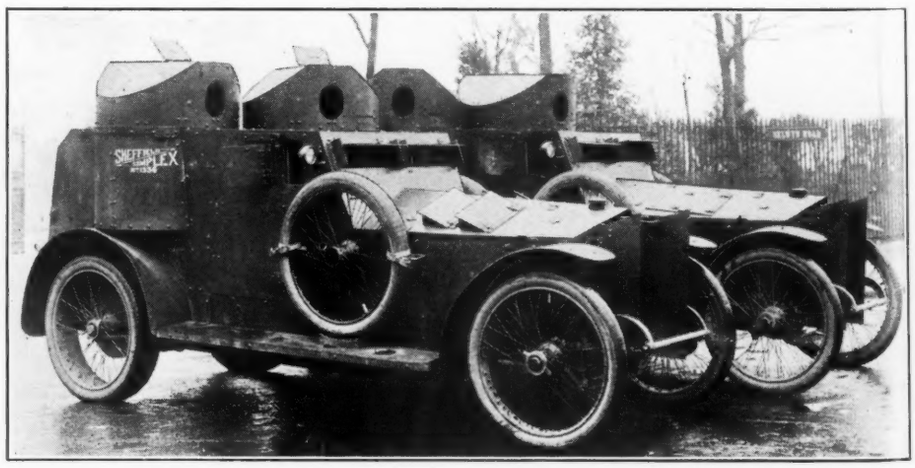
THE WELCOME AMBULANCE DESIGN COMPETITION

It will be remembered that in January, 1915, the Welcome Bureau of Scientific Research, in London, provided the sum of $10,000 to be distributed in prizes for the best designs of a field motor ambulance body, a commission being appointed to judge the competing designs and make the awards. In all 233 designs were submitted, and in those cases where practical tests were thought desirable, the bodies were constructed to the designs.

Now it has just been decided that the four most promising entries in the opinion of the judges should be invited to develop, complete and re-submit their designs, those selected being the designs of: Major P. Dwyer, R. A. M. C., Messrs. Henry Simonis & Co., Maberly Smith and Wolseley Motors, Ltd.

LONDON TRAFFIC DURING THE WAR

The effect of the great war on the traffic of London is made evident by the just published report of the London Traffic Branch of the Board of Trade. In 1914 the total number of cabs licensed was 8,651, a decrease of 1,769 from the number licensed in 1913, and the war influence was increasingly apparent during 1915, for by the end of the first half of the year the number had fallen to 6,638. In omnibuses, too, the same influence was evident, the number in 1914 being 3,120, as compared with 3,664 the previous year. By the end of the first half of 1915 the number had still further fallen to 2,602, of which 2,310 were gasoline driven, 175 gasoline-electric, and 117 steam driven. This decrease in numbers, due to the withdrawal of vehicles by the military authorities, was accompanied by the loss of over 4,000 employees who had left for military duty by the end of 1914, but in spite of these drawbacks, the number of passengers carried by omnibuses in London during 1915 amounted to 756,591,847, as compared with 733,931,201 in the preceding year.



Armored Cars Used by the English Army in France

These cars are equipped with starting and lighting devices, as it will be appreciated that in an emergency it would be impossible for a man to get out and crank the car. Although the machines are the Sheffield Simplex, made in England, they are using for starting and lighting purposes the USL Starter and Batteries, manufactured by the United States Light and Heat Corp., of Niagara Falls, N.Y.

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!